ENGINEERING AND MINING JOURNAL

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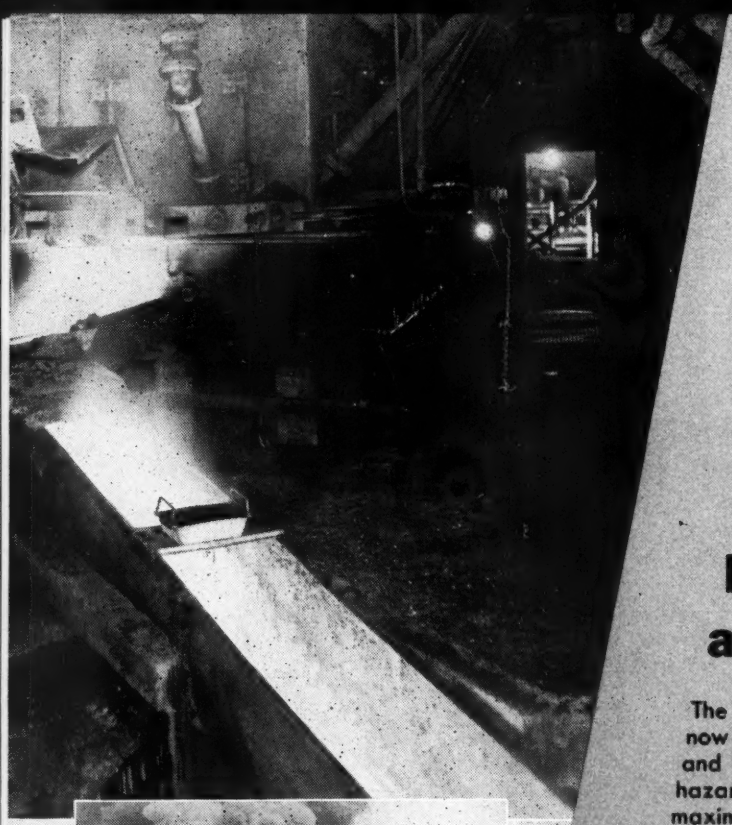
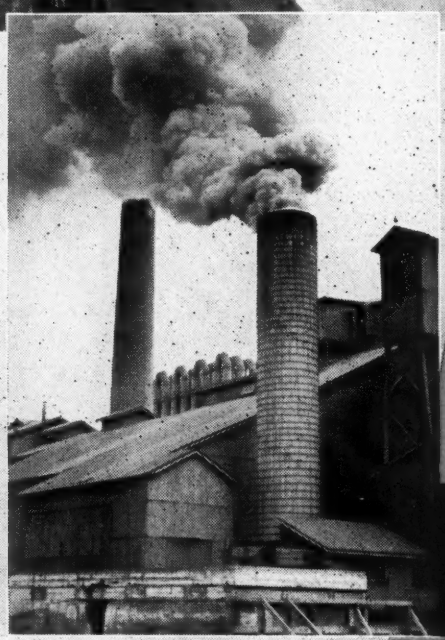
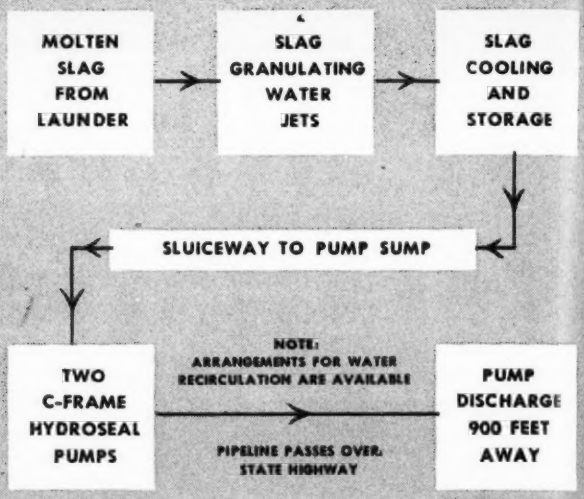
Erecting steel sets in Chateaugay No. 1 shaft at Lyon Mountain, N. Y.

Repairing the Chateaugay Shaft PAGE 70






MOLTEN SLAG FROM LAUNDER
SLAG GRANULATING WATER JETS
SLAG COOLING AND STORAGE
SLUICEWAY TO PUMP SUMP
TWO C-FRAME HYDROSEAL PUMPS
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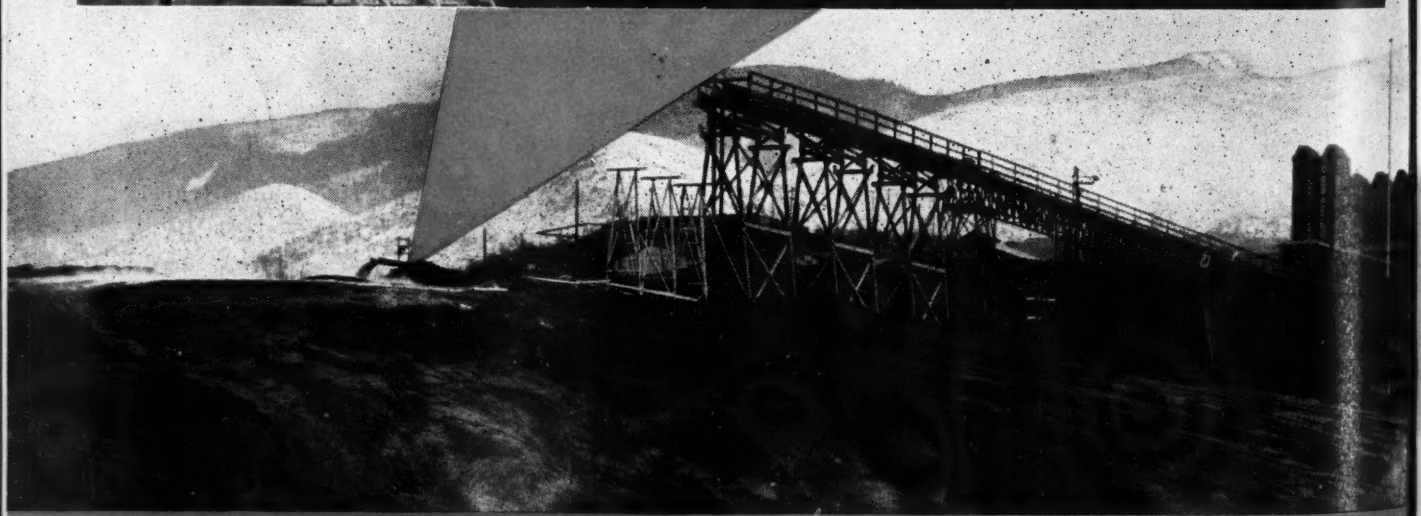
HYDROJET SLAG GRANULATING SYSTEM WITH HYDROSEAL PUMPS



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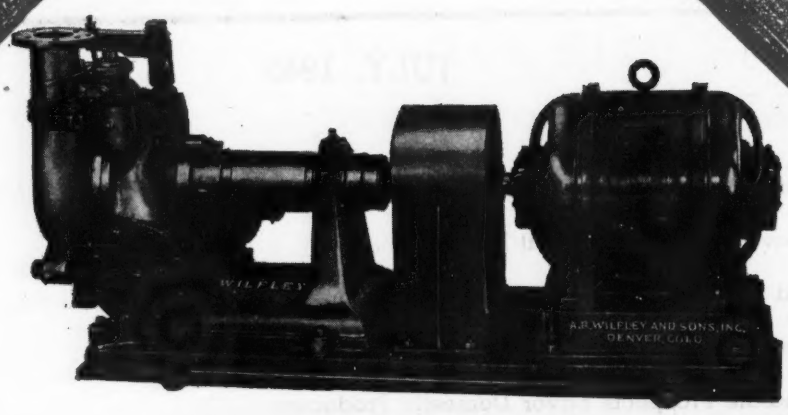

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STEADY JOBS *and* EQUIPMENT BUYING

SUSTAINED employment is not an attainable goal unless we can moderate the erratic fluctuations which have characterized the markets for producers' equipment in past periods.

In the 35th editorial of this series, "Sustained Construction Activity", it was pointed out that there is no specific that can cure our economy of its "boom-or-bust" proclivities. Rejecting the notion that the construction industry could be so managed as to stabilize business as a whole, that editorial stressed the important contribution it could make to that end, and suggested several practical expedients through which construction activity might be regularized.

Producers' equipment represents an area of production quite as broad and diverse as construction, though smaller in aggregate value. The classification embraces all types of durable equipment bought and used for profit—locomotives, motor trucks, electric generators, conveyors, machine tools, farm implements, and so on down to surgical instruments and dentists' drills.

Although the output of such equipment averages over a long period only 5 or 6 per cent of the nation's total output, it resembles construction in its extraordinary ups and downs. While its component items differ widely in the amplitude and violence of their fluctuations, the class as a whole is one of the most unstable sectors of the economy, making therefore a quite disproportionate contribution to the cyclical swings of total production and employment. From 1929 to 1932, for example, the decline in the output of producers' equipment (at constant prices) was 65-70 per cent, in contrast to a decline of 25-30 per cent in the national output exclusive of such equipment and construction.

A more recent example of the volatility of demand in this field may be found in the movement of a monthly index of orders for industrial equipment, which rose from 92 in the spring of 1936 to 160 in the spring of 1937, falling thence to 65 in the summer of 1938 and rising again to 142 in the fall of 1939. Such fantastic oscillations present an obvious and inescapable challenge to all concerned with economic stabilization.

Not only are these fluctuations bad for the economy; they represent demonstrably bad buying policy on the part of the purchasers of equipment. Peaks in demand come characteristically just before a business depression (1919, 1929, and 1937, for example) when machinery costs the most to buy and install and when it has the lowest expectancy of continuous use. At exactly the wrong moment everyone wants to buy. In the depression itself, on the other hand, with costs down, and with nowhere for the economy to go but up, equipment is a drug on the market. No one wants it when it is cheap and has the greatest prospect for steady employment. Here is a behavior pattern so profoundly irrational there must be hope for its correction.

There is an inveterate tendency for business management to forecast the future simply by projecting the trends of immediate past. Although it is axiomatic that the chance for an extended period of further prosperity is inversely related to the duration of the prosperity already experienced, this truism is generally ignored. The longer the boom has run, the more certain is business management that it will continue indefinitely. Convinced at last by "actual experience" that prosperity is here to stay, executives give the green light to commitments for expansion and modernization previously deferred in a skeptical attitude of "wait and see". The result, so often repeated in our economic history, is an explosive burst of demand for equipment coincident with, and contributing to, the final spasm of a boom. Witness the phenomenal rise in industrial equipment orders during 1928 and the spring of 1929.

The same prophetic illusion works in reverse during a depression. Recent experience is projected into the future. Although the mathematical probability of an imminent and prolonged period of prosperity increases directly with the duration of a depression, it finds little reflection in business decisions. Timidity and caution are the order of the day.

Compounding the errors caused by faulty perspective, are a number of influences which make it extremely difficult for individual enterprises to follow a policy geared to sensible long-term considerations. In a boom, particularly in its climactic phase, most producers find their order books crowded beyond the potential of their current capacities and are faced with the alternatives of expanding or losing trade to competitors. In depression the situation is reversed, and producers with unused facilities find it difficult to justify increases in their capital charges.

An even more controlling factor in many cases is the availability of funds. This is especially important

for small concerns. Typically such firms enjoy but limited credit, and with no ready access to the securities markets, their capital expenditures depend primarily on earnings. When they are making money, they can afford to buy equipment; when they are losing, they largely disappear from the equipment market. Even great enterprises, though less dependent on earnings as a source of capital financing, are profoundly influenced by the volume of internal funds available for the purpose, a volume as a rule far greater in prosperity than in depression. Moreover, it is usually easier in good times to obtain outside funds through the sale of stock or by borrowing, since in bad times bankers, underwriters, and investors are susceptible to the same timidity and caution that afflict business management generally.

We are dealing here with a combination of psychological, physical, and financial forces which conspire to aggravate the instability of demand for capital equipment. What can be done to reduce this instability and thus to bring equipment purchasing into a more sensible and constructive pattern?

There is no panacea, no royal road to the solution. The problem has been with us since the beginning of the industrial economy. It is complex and difficult. It is not, however, wholly intractable. We may reasonably hope that industry will, through intelligent effort, make substantial progress toward a satisfactory solution. The industrial equipment field is one in which government, except for war periods, has exerted little direct control. The best insurance against the institution of government measures is to so conduct activities in the equipment field that no justification for government interposition can be made.

☆ ☆ ☆

1. The first and most important step is for industry itself to reconsider its heretofore haphazard and opportunistic policy in the purchase of equipment, substituting so far as possible a regularized, long-range programming of expenditure that will resist both the excited long-buying of booms and the equally disturbing underbuying of depressions. Such long-range programming is particularly appropriate and advantageous for large enterprises in established industries such as railroads, electric power, steel, automobiles, and the like, but it makes sense much more generally.

Once executives come to realize that a reasonably stable equipment program contributes not only to the welfare of the economy but also to the lowering of their long-run equipment costs, the opportunity to combine a public service with private advantage should induce them to recast their policies accordingly.

There is an even more compelling reason for purchasers of industrial equipment to do everything possible to regularize their demands. Some concerns unquestionably will find themselves in a postwar position where speedy delivery of needed equipment, even though it involves the payment of premium prices, will seem to be justified. But there is no system of accounting that can show it to be a profitable transaction to promote an equipment industry boom that runs a brief course only to collapse when the backlog of deferred maintenance and development has been satisfied. That, historically, has been the trigger which trips the door to the depression phase of the business cycle. No immediate advantage can compensate for the contagious paralysis that infects all business enterprise when major layoffs occur in any major segment. No precautionary measures, self-imposed by business, can be regarded as unduly severe if they can prevent this devastating blight.

2. Financial agencies can and should play a responsible role in regularizing equipment demand. Funds for the purchase of producers' equipment should be offered boldly and at low interest during depression periods, and should progressively tighten as a boom market bids up the price of purchase and installation. Banks and financial houses have excellent facilities for gathering and interpreting market and general economic information. It is good business for them, and for the national economy, to exercise their accepted discretions in a manner that will help to promote economic stability.

3. There now is almost universal recognition of the need for a thorough-going revision of our corporate tax structure to the end that effective incentives may be offered for private capital investment. The possibility of including provisions which would offer special tax concessions to equipment investments made in depression periods is worthy of intensive exploration.

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The fundamental problem here is educational. If all business enterprises in a position to do so were to regularize their equipment expenditures, it would have a tremendously beneficial effect. True, it would accomplish no miracles. For many concerns it is not feasible to schedule equipment buying over a long period. Even those who do schedule it are likely in practice to attain only a relative stability. It must be acknowledged, moreover, that few programs could withstand indefinitely a very deep and prolonged depression such as we had in the thirties. Nevertheless the adoption of stabilization policies where feasible would make a signal contribution both to the restraint of booms and to the mitigation of depressions. Here is something industry can do for itself.

It is easy to disparage such remedies for economic instability as are here proposed on the ground that they are partial only. However, joined with others also partial, they can achieve in combination a solid progress toward the goal of sustained high level employment—progress that is unattainable through economic cure-alls. The road suggested is a slow road, and difficult, but it leads upward.

President, McGraw-Hill Publishing Co., Inc.

ENGINEERING AND MINING JOURNAL

July, 1945

Government and the Mineral Fertilizer Industry

HOW FAR is the Federal Government going to inject itself into the business of making fertilizers and to compete therein with private industry? This question has presented itself ever since the years following the first World War, when the matter of making use of the Government's idle nitrate plant and the power supply at Muscle Shoals was agitated. With the creation of the Tennessee Valley Authority came the peacetime entry of the Government into the fertilizer business, as TVA began to make use of the facilities at Wilson Dam in experimental work with Southern phosphate in electric furnaces. As these activities grew, both in making power and fertilizers, they have tended to establish yardsticks for costs in each field in the area affected.

Today TVA, more strongly supported than ever in the farm communities of a wide area, intends to stay in the fertilizer business if it can, even though its attention has been temporarily diverted in large measure to products needed for the war. At the same time and for the same reason, difficulties are increasing for the privately owned fertilizer industry, including the miners of potash and phosphate.

Affecting the potash producers adversely and arousing their fears are the new potash regulations which pertain to exploration permits and new leases on public lands. These already have been approved by Secretary Ickes and have the force of law. They impose a limit on the issuance of exploration permits, which very definitely tends to discourage exploration. Without exploration a mining enterprise will sooner or later dry up. At the same time Mr. Ickes' department has resumed exploration drilling, even though no money was appropriated for it. In 1944 the Bureau of Mines and the Geological Survey revealed an additional 18 million tons of potash, according to Dr. Oliver C. Ralston, of the Bureau.

These potash regulations further provide that the Secretary, on a year's advance notice to any lessee, may purchase one-quarter of his output at a price to be determined by the Secretary and not to exceed the prevailing wholesale refinery price. Why should any enterprise be subjected to such a provision? It seems that the Secretary and his associates intend that private operation shall wane as Government operation grows. The companies, one by one, will eventually cease to operate without new exploration, and no new private companies are likely to enter.

A greater cause for concern, affecting the well-being of the miners of fertilizer minerals, is Senate Bill 882, introduced by Senators Hill and Bankhead. Its stated object is to establish a national fertilizer policy and program. A parallel bill has been introduced in the House.

As drawn, S-882 states that Congress "finds that the nation's soil resources have been depleted to an alarming degree" and provides as a remedy that Congress should keep the rest of the phosphate and potash in the public domain as a perpetual public trust.

Congress should know, and probably does, that there is an overwhelming abundance of phosphate. Such finding resulted from the nation-wide hearings conducted by the specially appointed Congressional committee in 1938. If anyone has forgotten, let him consult Mr. Mansfield, of the Geological Survey, whose estimates have been published since the investigation.

As to potash, we suggest that the Senate Committee to which S-882 will be referred should inquire of Mr. Elmer Pehrson, chief of the Bureau of Mines' Economics and Statistics Branch. Only last February, when addressing the New York Section of the A.I.M.E. on the mineral position of the United States and the outlook for the future, Mr. Pehrson showed that approximately 90 percent of our original commercial reserves of potash still remain. These are estimated at 90,000,000 tons of K_2O. As to the resources that are not counted commercial at present, he said "Potential reserves of . . . potash . . . are significant

because they assure ample supplies . . . if we are willing to pay the price for them."

Informed people will not be inclined to worry about a commercial reserve of potash that is good for approximately a century at the present consumption rate, or for 50 years if that rate is doubled, as some think it should be. All the less will they worry if that commercial reserve be backed by a huge potential supply at home that can be had if wanted. Also, total foreign reserves are many times the size of our own.

As to whether the nation's soil resources have really been so badly depleted of their potash, according to Plant Food Memorandum Report No. 11, issued in March, 1945, by the Agricultural Research Administration of the U. S. Dept. of Agriculture, "The soils of this country are far richer in potash than in nitrogen or phosphoric acid. The surface six inches of our crop land contains approximately 5,000 million tons of potash or as much as the total known world reserves of water-soluble potash." Succeeding layers contain even higher proportions, so that erosion will not deplete this important resource.

On both counts, there seems to be no good ground for setting up the trust for the public in perpetuity as the bill prescribes.

S-882 would also permit TVA to build a phosphate fertilizer plant at Mobile, Ala., and acquire Florida phosphate lands for raw material supply, Congress providing the needed funds. It would likewise put the farm cooperatives into the fertilizer business with Government money if needed be, and further provide for two Government plants in the West for making fertilizer with Western potash and phosphate respectively. An elaborate educational program for demonstrating the use and value of high-strength fertilizers would be pushed in all the farming areas.

The proposals cited from S-882 seem to involve cross purposes. On the one hand, conservation and careful use of the domestic fertilizer mineral reserves appear to be wanted. On the other, construction of additional plants would involve more rapid use.

Why should private enterprise in the fertilizer business be discouraged? What aspect of the public interest is served thereby? The Government already has the right to inspect the private developments on public land to assure workmanlike operation and conservational extraction. Private enterprise is certainly able and willing to provide increased capacity up to whatever the market will absorb.

One fact stands out: In the objectionable clauses of the new potash regulations we at last get a picture of how Secretary Ickes would treat the mining industry, if he could only wipe out existing mining law and require operators on public land to work under lease.

Misunderstanding Over Subsidies

IN SIGNING THE BILL authorizing payment of wartime subsidies for another year, President Truman stated: "I interpret it as the desire of Congress that these subsidies shall be paid only as long as, and to the extent necessary to secure, needed war production under existing price ceilings. As opportunity permits, therefore, subsidy programs will be reduced or discontinued as rapidly as feasible within the limits of the present law." Pointing out that the law would prevent curtailment of copper, lead, and zinc subsidies, the President indicated that if it became clear that the payments were no longer necessary for war purposes, he would request enactment of new legislation permitting a reduction "of such unnecessary subsidies."

This attitude, also reflected in some influential newspaper comment, fails to take into account the extensive planning and pre-production development work necessary to operate a mine properly. In order to justify these activities and thus assure a continued supply of these vital materials, the mine operator must have something more substantial on which to proceed than the grace of a committee dominated by profit haters.

People who criticize the special treatment accorded copper, lead, and zinc do not realize the length of time that the management of a well-run mine must plan ahead and the extraordinary expenses that must be borne prior to actual extraction.

We believe that if the Government, instead of guaranteeing a year's premiums, should say to copper, lead, and zinc producers, "Operate your properties in a workmanlike manner for maximum production, and we will indemnify you for any unnecessary expense in case the production is not needed," the policy would be more expensive than the simple expedient of guaranteeing premiums for a year. Endless litigation is avoided by use of the premium system. Moreover, the present plan produces actual minerals, acceptable for military stockpiles if not needed for this war. Even at above-the-market prices, this represents definite value received. On the other hand, if there were no premium guarantee, either continuance of adequate production would be endangered, or there would be a host of postwar lawsuits, expensive and nonproductive, dragging out for years.

Curtains for L-208

AT LAST the ill-starred gold mine closing order, L-208, has gone to limbo, with the almost unanimous approval of the mining fraternity. Since its inception it was an unproductive nuisance; after it proved to be so, it survived simply because of official reluctance to admit a mistake.

Probably, if the gold miners had been the victims of a uniformly applied policy repressive to industries not essential to war making, there would have been no great resentment. However, when they were singled out for suppression, while such enterprises as liquor, cosmetics, jewelry, and amusements were permitted to continue—even racetracks were only temporarily stopped—they were naturally and properly aggrieved. Also, they felt justifiable resentment when our Government aided other governments, indirectly if not directly, to keep their gold-mining industries operating. In effect, we were recognizing other countries' gold mining as essential while treating our own as the most superfluous of all activities.

Now that the onerous regulation is cancelled, it remains to be seen what level of productivity gold miners can achieve. Theirs is no bed of roses. All will face important costs of rehabilitation, which in many cases will require new financing. Wages and supply costs will be greater. Also, for many months there is likely to be a sufficient shortage of labor in gold-mining areas to prevent operations proceeding at a maximum-efficiency rate. With all these complications, the price of gold is no higher, and the domestic gold miner is prevented by an undemocratic Government policy from obtaining the premiums private purchasers might be willing to pay.

Despite their difficulties, gold miners would not be what they are if they were deterred by hardship. We predict that they will surprise anyone who bases his judgment solely on statistics.

MILLING AROUND

It is reported from Alaska (p. 135) *that a large number of veterans are interested in prospecting there after the war. If President Truman's prophecy that the veterans will run this country after the war is correct, probably Secretary Ickes will not find it expedient to continue hamstringing private mineral development in Alaska.*

In June, Washington officials expected the greatest local unemployment and confusion incidental to reconversion to develop in August and September.

The U. S. Plant, Soil, and Nutrition Laboratory announces that manganese in the diet is essential to the maintenance of fertility in males and females. No telling what new uses may develop for the metals when the brave new world gets going.

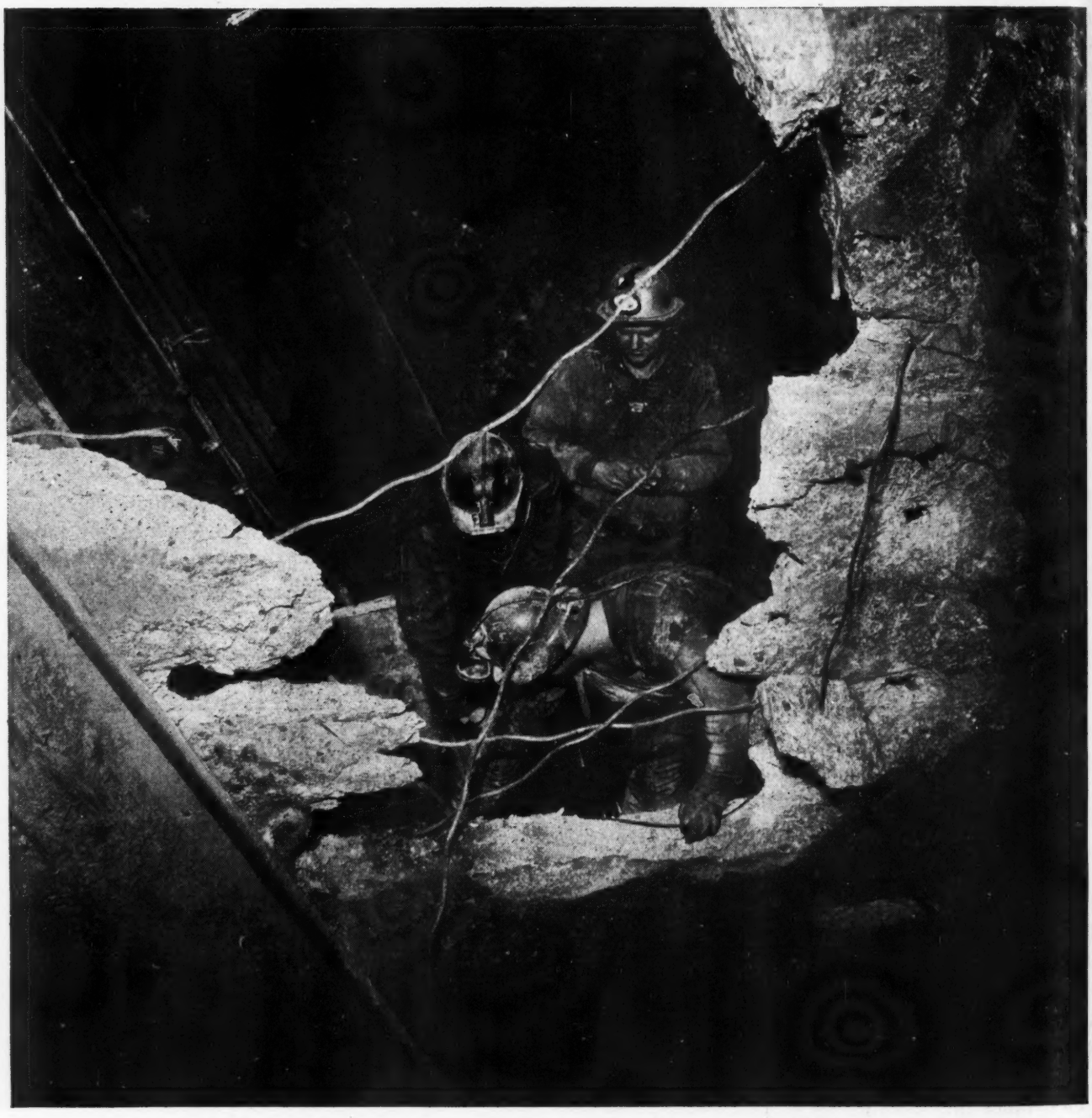
New evidence of the incomprehensibility of Japanese psychology appeared when it was discovered that the Nipponese, although carrying on wanton destruction elsewhere, left Soriano's Masbate property, in the Philippines, fully intact. Equipment was oiled, painted, caulked, or properly stored, to prevent deterioration.

To insist, as the State Department does, that ratification of trade treaties in accordance with the Constitution would wreck the Trade Agreements program is equivalent to saying that the Senate is so subservient to pressure groups that it will neglect its duty to the people at large. We cannot understand why the Senate, in passing the Reciprocal Trade Act for the fifth time, thus confirms the validity of this serious accusation, pointed up by the fact that other countries subject their trade pacts to legislative ratification.

At San Francisco the French tried unsuccessfully to write the provison about access, on equal terms, to the trade and raw materials of the world into the United Nations charter. Since the Atlantic Charter made this interesting pledge, we have wondered if and how the signatories were going to make it good.

Brazil has granted its gold miners freedom to sell their production privately or to the Government, as they wish. If we wish to preserve our tradition as a "land of the free" we could take a lesson from Brazil and abolish the present absurd legislation that makes gold contraband.

We note that, despite the disposition of many officials here and abroad to look upon gold as unnecessary to modern currencies, both Great Britain and China took action recently to adjust their prices of gold to meet new conditions. The British lifted the price principally because of reduced handling charges, and China, in the throes of inflation, was compelled to raise the price drastically (pp. 104, 106).



Concrete divider walls, here being torn out, had been the only support used in the part of the shaft repaired, prior to the accident.

EARTHQUAKE SHATTERED 500 FT. OF CHATEAUGAY SHAFT

FOR SEVERAL YEARS prior to 1944 the main shaft of the Chateaugay iron mine, at Lyon Mountain, N. Y., in the Adirondacks, had presented a maintenance problem, due to the frequent need of scaling the walls, with resultant damage to the track. This shaft, which is inclined at 63 deg. to the horizontal, was opened in 1919 and sunk to a depth of 900 ft. along the footwall of one of the large magnetic oreshoots. In 1941, Republic Steel Corporation, having acquired the property a few years before, deepened the shaft to 2,350 ft. and in that year and the two that followed all previous hoisting records were broken, under pressure of war demand. Chateaugay No. 1 shaft, as it was known, became one of the leading iron ore producers of the country.

Rocks cut by the shaft include gneiss, syenite, pegmatite, and basic dikes. Several faults are also encountered. Much of the shaft is in what is locally called "popping" rock, a condition which tends to make trouble if not properly handled.

Support for the ground was necessary throughout the length of the shaft. Concrete divider walls had been installed in 1922 in the older 900-ft. portion and had been extended when the shaft was deepened. No lining was used. The divider walls had been expected to give all necessary support.

Maintenance difficulties increased and by May, 1944, the condition of the walls at the 1,226 pocket had

Shaft Repaired in 11 Days

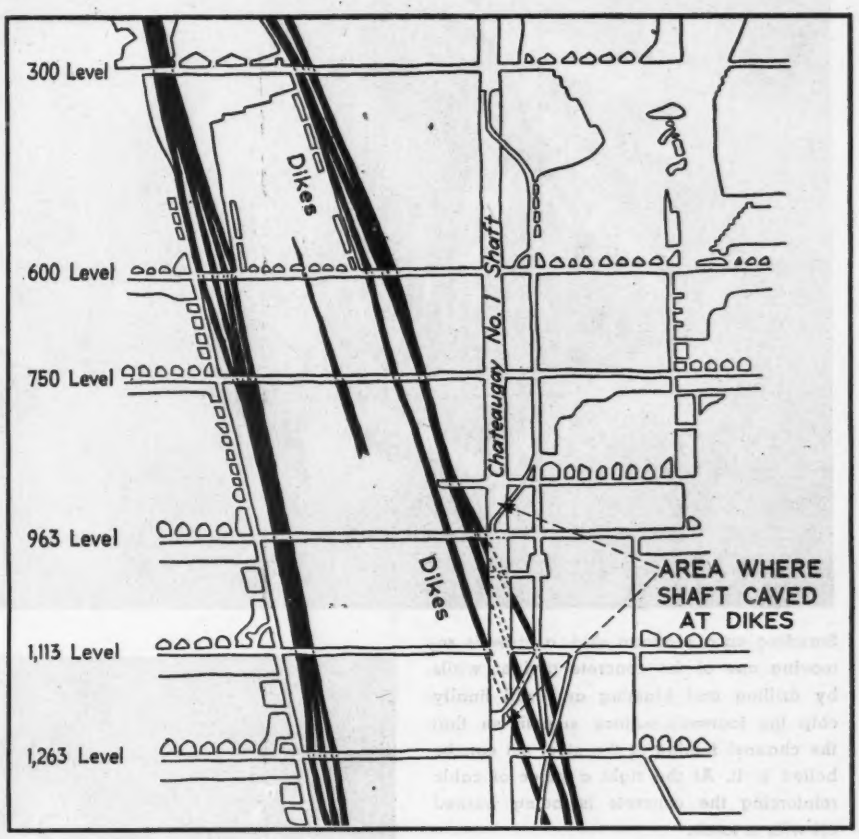
WILLIAM J. LINNEY, District Manager, Republic Steel Corporation, Lyon Mountain, New York

The Repair Work Step by Step

By the time the extent of damage was known, the mine had been without power 23 hours. Water had reached the 2,213 level crusher and pump station. The pump was flooded. Under hazardous conditions, power and telephone lines were snaked through 150 ft. of the 4-in. shaft drain line, which was still open. Unwatering was started with a sinking pump which had been transferred through raises from the 963 level to the shaft above the 2,213 level. To make this installation electricians and pump men climbed down and up a distance of 1,350 ft.

Shaft clearing was begun after putting a bulkhead across it at the 1,263 level. The skips were worked down from the pocket and taken off and the ropes wound up. Some muck came down with them, but large pieces had to be blasted down by placing powder with long poles and using pullwire lighters. This rock and concrete were mucked off the station platform and dumped down an old stope.

(*Continued on next page*)



Damage to the Chateaugay No. 1 shaft was greatest where the ground was cut by dikes. This shaft is inclined to the vertical at 83 deg. and is 2350 ft. deep.

become so bad that it was decided to support them with steel beams resting on the concrete divider walls.

While this work was in progress the region was shaken by an earthquake, recorded in Ottawa, at 7:03 p.m. on May 29, 1944. That something serious had happened underground speedily became evident. Eleven men were known to be in the mine at this time, four of whom were supposed to be in the shaft at the 1,226 pocket. When efforts to contact them by telephone failed, a rescue squad was soon organized.

The man skip then at surface was lowered and finally came to a stop, wedged between shattered concrete divider walls at the 900 level. Continuing down the ladders to a point 75 ft. above the pocket, the rescue men found that the shaft was completely blocked. Repairmen then cleared the way for the man skip down to the 963 level. This proved to be open, and the rescue party made its way via a raise down to the 1,263 level and back to the shaft. Here they climbed the ladders to the caved area at the 1,226 pocket, where three men were now known to be trapped. Two of the latter were rescued and the body of the third was recovered.

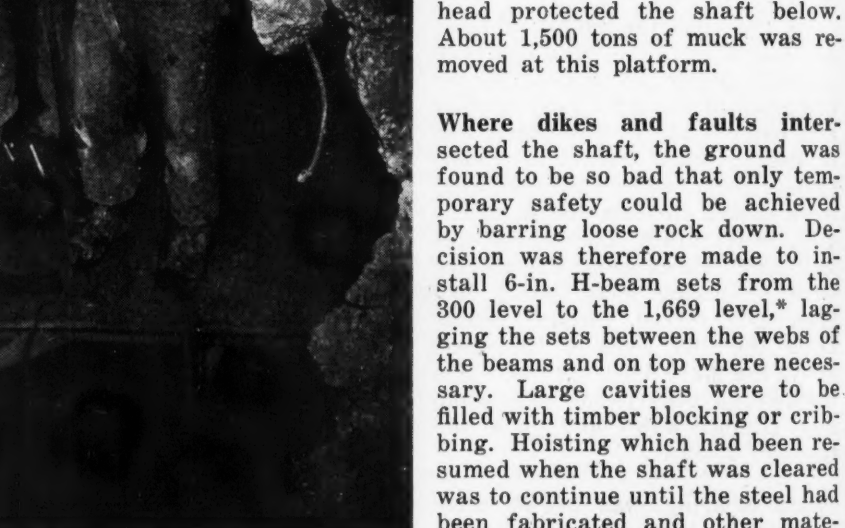
Inspection revealed that the shaft had been shattered for 500 ft., the worst portion being that between the 1,113 and 1,263 levels. Power cables were cut and two pump lines were broken. Accompanying pictures show how the shaft was cleared and repaired for service again and how steel sets to support the ground were then installed.

Standing on a platform skid, a crew is removing one of the concrete divider walls by drilling and blasting and will finally chip the footwall surface smooth so that the channel footing of the steel set can be bolted to it. At the right a piece of cable reinforcing the concrete is being burned off with a torch.

After the shaft was clear, new ropes were put on and new skips at the collar. To permit barring without muck falling on the skips a rectangular hole was cut in the front of each.

The 500-ft. shattered section from the 750 level to a little below the 1,263 level was then scaled down, starting at the 750 level and working from the skips, after putting a bulkhead across the shaft at the 963 level. About 1,000 tons of muck was caught on this bulkhead and removed as before. After this section was declared safe, this bulkhead was removed and scaling was continued on down to the 1,263 level, where a similar bulkhead protected the shaft below. About 1,500 tons of muck was removed at this platform.

Where dikes and faults intersected the shaft, the ground was found to be so bad that only temporary safety could be achieved by barring loose rock down. Decision was therefore made to install 6-in. H-beam sets from the 300 level to the 1,669 level,* lagging the sets between the webs of the beams and on top where necessary. Large cavities were to be filled with timber blocking or cribbing. Hoisting which had been resumed when the shaft was cleared was to continue until the steel had been fabricated and other mate-



Supervisory force looking at a blueprint. Left to right, William J. Linney (author); Francis Hamelin, shaft foreman; John Kerttu, mining engineer; Joseph Tolosky, mine foreman; Clifford Cayea, shaft foreman; and Walter Crusberg, mine superintendent.

rial received. Two weeks would then be allowed for erection.

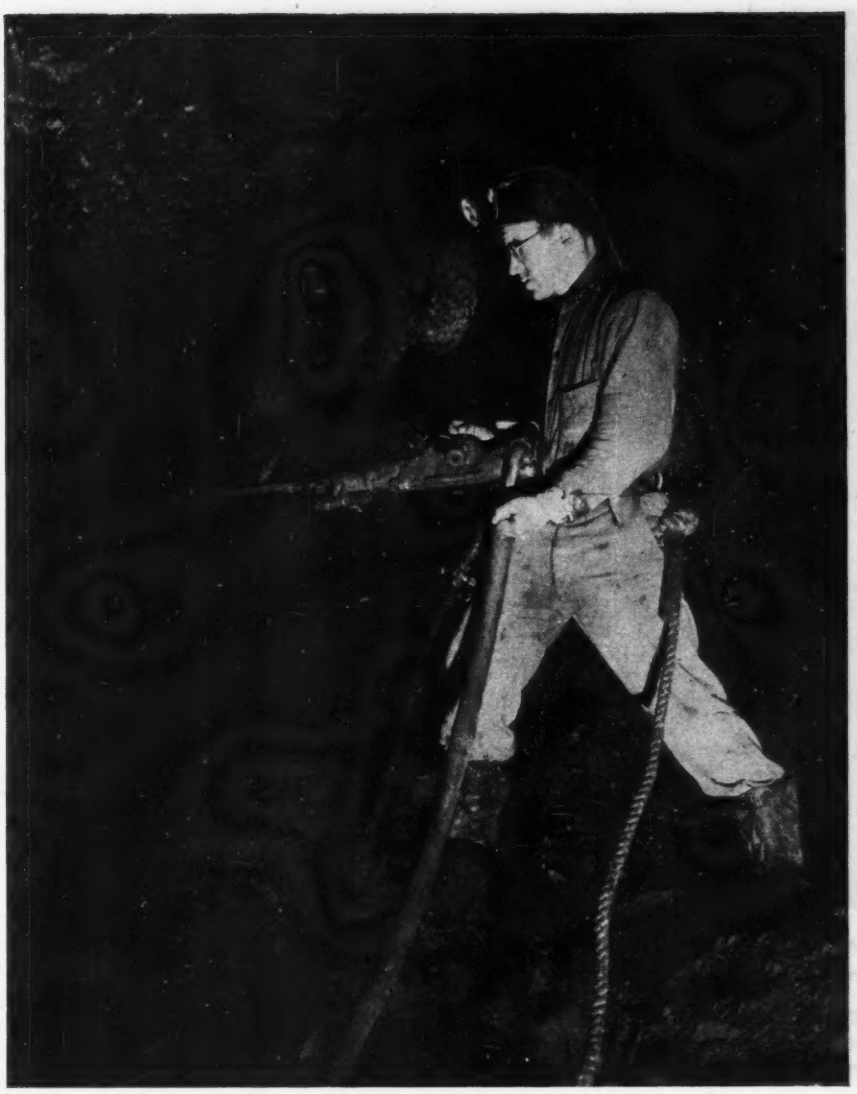
To make room for the steel, what remained of the concrete divider walls would have to be removed, the shaft opening would have to be enlarged wherever it might be too tight for the steel, and the footwall chipped smooth where the divider walls had rested.

The job was split up into three sections with three shifts of ten men each. A foreman was responsible for the progress and safety in his own section. There were two working places in each section and the work proceeded simultaneously in all sections.

To support the men when working in the half dozen working places, the three skips, already employed for scaling, were used in the upper portion. For the other working places a platform skid was designed to slide on the skip tracks. These were operated by single-drum air hoists set up on the station platforms.

To finish the job on time, needed material had to be lowered and stored at the levels that were used as operating bases. This included steel, bulkhead timber, lagging,

*When the shaft was originally sunk, steel sets of 4-in. angle iron and 12-in. I-beams were installed from surface to the 300 level. Republic, when it deepened the shaft in 1941, installed steel H-beam sets in the new portion from the 1,669 level to 2,350 level. With the completion of the recent repair job, the shaft is now supported with steel sets throughout its length.



Loose ground in the shaft is being drilled and blasted. To scale big fragments down might result in smashing the bulkheads. So they are broken up into smaller pieces.

The two ore skips and, at the right, the man skip used in the upper part of the shaft. A rectangular opening has been cut in the front of each ore skip (see one at left) to permit barring from inside so that the rock will not fall on the skip. Note that the steel work is partly in place, especially the channels on the footwall.

Anchoring the steel channel to the footwall. The other end of the anchor pin is split, with a wedge in it to make it fit tightly when driven home.

Erection of the supporting steel is progressing downward in the 63-deg. shaft. Note the H-beam posts standing on the channels and at the top the angle runners supporting the H-beam wall plates. At right men are working from a platform skid. (Looking up shaft.)

oxygen and acetylene equipment, platform skids, tools, etc.

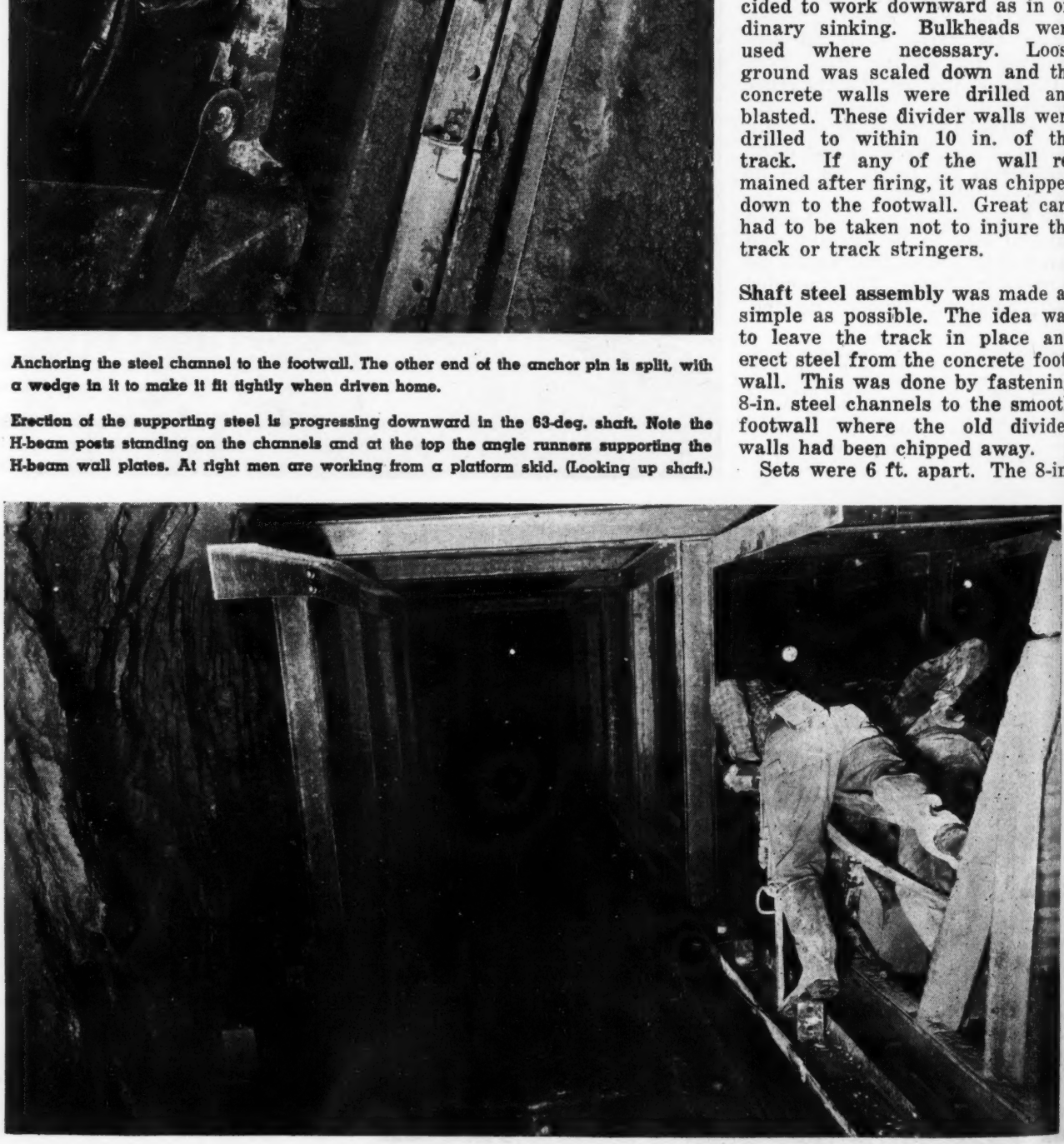
Swinging timber bulkheads were installed in the man cage compartment on each level to permit use of the cage for moving men and supplies.

The first portion of the shaft to be supported with steel sets was the 150-ft. section between 1,113 level and 1,263 level. In this section the condition of the walls around the 1,226 pocket had become so bad that steel was fabricated in the mine shops in order to get started.

In the bad sections, including the one just mentioned, it was decided to work downward as in ordinary sinking. Bulkheads were used where necessary. Loose ground was scaled down and the concrete walls were drilled and blasted. These divider walls were drilled to within 10 in. of the track. If any of the wall remained after firing, it was chipped down to the footwall. Great care had to be taken not to injure the track or track stringers.

Shaft steel assembly was made as simple as possible. The idea was to leave the track in place and erect steel from the concrete footwall. This was done by fastening 8-in. steel channels to the smooth footwall where the old divider walls had been chipped away.

Sets were 6 ft. apart. The 8-in.



channels were 12 ft. long so they could accommodate two sets.

Holes were drilled through the channels and concrete into the footwall. Split anchor pins were driven in and the nut was taken up tight against the channel. Two anchor pins were used for each 12-ft. channel.

The set was then assembled on the channels. The dividers or posts were bolted to them; then the 4x6-in. angle-iron runners along the hanging wall were bolted to the dividers. The 6-in. H-beam wall plate was then bolted to the angles. No angle clips were used except on the channels.

Four-inch plank lagging was fitted into the web of the wall plate. A piece of the wall-plate flange on the back side had to be cut off to slide the boards into the set.

Because the set was firmly anchored by the channels, bearer or anchor sets spaced about 125 ft. apart were concreted after all the steel had been erected.

Lagging and blocking on top of the steel was necessary at the 1,226 pocket and 900 level. About fifty cords of blocking were used at each place.

Divider bulkheads or walls, to close off the man-cage compartment, were made by inserting 3-in. plank in the web of dividers. The ribs were lagged with 2-in. plank.

The job was completed in 11 days.

Installing plank brattice walls in the steel sets. Men are working from a platform skip.

Shaft steel is being erected at 1,513 level station. The platform skids on which the men are working in each compartment are operated respectively by the three single-drum tugger hoists in the foreground. These hoists have a rated pull of 2,000 lb. and are mounted on a securely set-up wide-flange steel beam.

Readers Approve Views

READERS OF *E.&M.J.* have been moved to an unusual extent to voice approval of the proposal published in the April issue that the United States should develop a consistent, informed mineral policy. To the suggestions on how to deal with various aspects of the problem there has also been general approval. A considerable number of letters expressing reactions has come from mining men all over the country.

Most of those commenting have asked that the views stated should be kept in confidence; therefore, they cannot be quoted. However, we believe that it is important to acquaint our readers with the salient points in these letters on which differences of opinion have been expressed.

Can Committees Function?

Not a single person has evinced lack of accord with the view that the mining industry ought to take an active part in formulating mineral policy by forming representative standing committees to cover different problems affecting the industry. However, several readers expressed skepticism that committees thus formed would function effectively.

Based on past performance, the validity of this skepticism can hardly be questioned. Nevertheless, we dare to believe that the mining industry, like most human beings, will rise and meet a situation when the need becomes thoroughly self-evident. We believe it to be obvious that the interests of the mining industry are undivorceably entangled with national policy and that competent managements will recognize this fact.

Government Control Feared

The point of difference which evoked more comment than any other was the impression that the proposals in general—no one in particular—foreshadowed more control of mining by the Government than readers were willing to contemplate. The establishment of subsidies or quotas in lieu of orthodox tariff, future participation in cartels, more effective support of American enterprise abroad, stockpiles as economic cushions, or the maintenance of marginal mines, all would bring the industry's economy closer within the ever-expanding web of Government controls.

We believe that this conception is correct—i.e., that fulfillment of the proposals *would* bring Government farther into the industry's affairs than before the war. Also, on principle we view with conspicuous lack of enthusiasm the encroachment of Government into business.

Nevertheless, realism forces us to acknowledge a trend which in the mineral industry did not begin with the New Deal and is worldwide in scope. This trend is the increasing tendency of people to view resources as public property, at least to the extent of demanding that materials so vital to national well-being must be handled with full regard for the public interest. To this trend the New Deal disposition to shackle all business simply gave impetus, added a thousand annoyances, and lent encouragement to a crackpot fringe that, lacking a fundamental faith in the decency of average people, would like to cure all inequities by regulating all human activity. However, despite the demise of the New Deal, there seems to be little hope for a genuine reversal of the tendency to regulate. Also, the mining industry problem will be accentuated if the public is persuaded that our mineral resources are in danger of exhaustion.

Beyond these circumstances is the fact that any effective effort to prevent war must necessarily include measures to prevent belligerents from accumulating mineral stockpiles and thus involve some degree of control of the world's minerals.

Facing these complications, it seems as though the common-sense approach will be to define logically the part of Government in mineral affairs rather than to hope vainly for a retreat of Government back to a prewar status. In other words, there are certain national and world problems affecting minerals which must be faced. If these problems can be met with less Government interference than is implicit in our suggestions, we will heartily endorse any practical alternatives to that end.

Cartels Can Improve

In the matter of cartels, several readers acclaimed our viewpoint that cartels operated fairly and in the open can effect improvements in average production costs and in conservational practices which purely competitive industry cannot do. The term "cartel" as used here means any combination of competitors, with or without Government participation, to prevent prices from falling to levels which force abandonment of high-cost mines or unconservational operation (high-grading) of better mines. Experience with the Interstate Oil Compact and the Tin Cartel has demonstrated that cartels can be operated in the public interest if the combinations will forswear the temptation to misuse their power and to protect inefficiency.

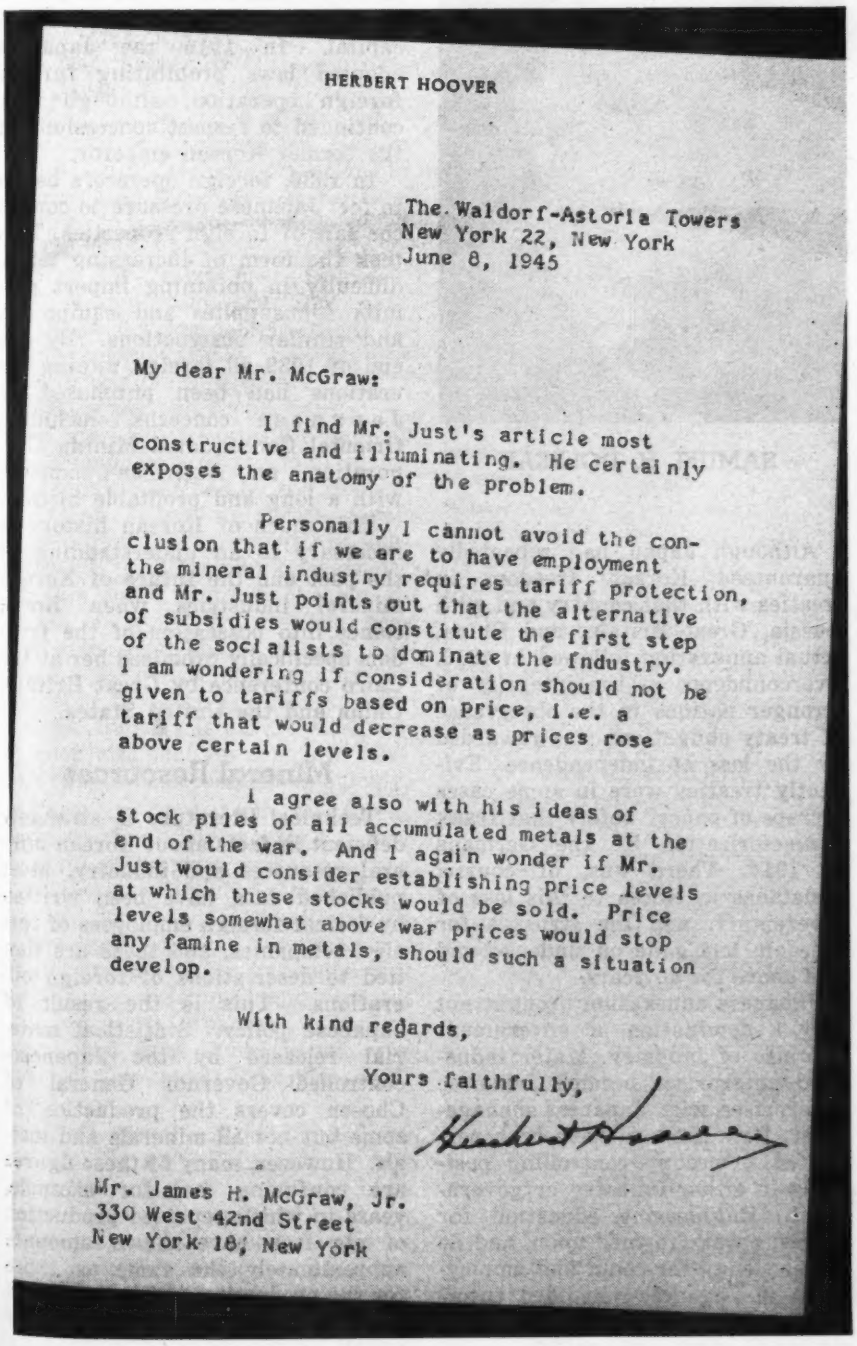
Are Tariffs Adequate?

In passing on the proposals to modify our system of tariff protection by establishment of import quotas or by substitution of direct tax-supported subsidies for tariff, it was obvious that many readers found these suggestions distasteful partly because they would involve continual investigation of business activity by Government and partly because operators would be more at the mercy of bureaucratic administrators than under ordinary tariff. Also, fear was expressed that a direct subsidy program would tend to encourage inefficiency.

We acknowledge the correctness of all these criticisms, and freely admit that a subsidy is pretty much what its administrators make of it. If they are allowed to set themselves up as reformers and deny benefits to all who do not meet a variety of standards they elect to set up, the result could be intolerable. Moreover, if due precautions are not taken to encourage operating efficiency, serious harm could be done.

on Mineral Policy

We can only rejoin that there are certain problems to be met, as sketched in the article under discussion. We believe the present tariff structure is inadequate to meet them. The proposals made were simply toward finding solutions rather than waiting for a crisis to force action that, hastily taken, may be ill advised. We are sure that nearly all readers will concur with our view that the simplest solution that will meet the problems is the most desirable but that there is no use depending on an inadequate prop.



HERBERT HOOVER

The Waldorf-Astoria Towers
New York 22, New York
June 8, 1945

My dear Mr. McGraw:

I find Mr. Just's article most constructive and illuminating. He certainly exposes the anatomy of the problem.

Personally I cannot avoid the conclusion that if we are to have employment the mineral industry requires tariff protection, and Mr. Just points out that the alternative of subsidies would constitute the first step of the socialists to dominate the industry. I am wondering if consideration should not be given to tariffs based on price, i.e. a tariff that would decrease as prices rose above certain levels.

I agree also with his ideas of stock piles of all accumulated metals at the end of the war. And I again wonder if Mr. Just would consider establishing price levels at which these stocks would be sold. Price levels somewhat above war prices would stop any famine in metals, should such a situation develop.

With kind regards,

Yours faithfully,

Herbert Hoover

Mr. James H. McGraw, Jr.
330 West 42nd Street
New York 18, New York

Doubt Over Stockpiles

Referring to the stockpile policy, approval was unanimous of stockpiles for military security, but reactions were varied over the proposition of using stockpiles as economic cushions to protect the domestic mining industry against reconversion shocks or an extraordinary flow of imports. Many readers identified with lower-cost operations were opposed to the postwar encouragement of uneconomic enterprises, and feared that stockpiling in excess of military needs might be administered in that direction. Also, many mining men are opposed to Government trading in their markets, fearing that a Government stockpile in excess of military needs would be used by crackpot reformers in Government as a club over industry.

End the Feud Between Government and Industry

In brief, we believe that the fears which readers have expressed over continued encroachment of Government on private enterprise are realistic. However, it is questionable if a sound cure can be accomplished by simply doing everything possible to push Government out and slam the door after it. The logical course is to end a feud between Government and business which has done serious harm to the public interest ever since the early days of the New Deal, to the benefit of nobody except a few politicians. If this enmity is not ended, we shall soon find ourselves hopelessly outdistanced in international competition by business people who work in close harmony with their own governments and receive effective support.

If this nonsensical feud can be ended and the Administration ceases to make Government agencies a haven for the lunatic fringe, then it should be feasible to sit across the table from Government and contemplate mineral policies without obscuring problems in prejudice and distrust. Only in this way can the logical relationship between Government and business be settled. Any other approach is a mere expedient, which complicates and perpetuates our fundamental problems.

Korea: a Field for Capital, Management and Engineers

SAMUEL H. DOLBEAR, New York, N. Y.*

Release of the Japanese stranglehold on Korea will afford an unusual opportunity for outside capital, management and engineering to resume the development and production of Korean minerals in cooperation with the Korean people.

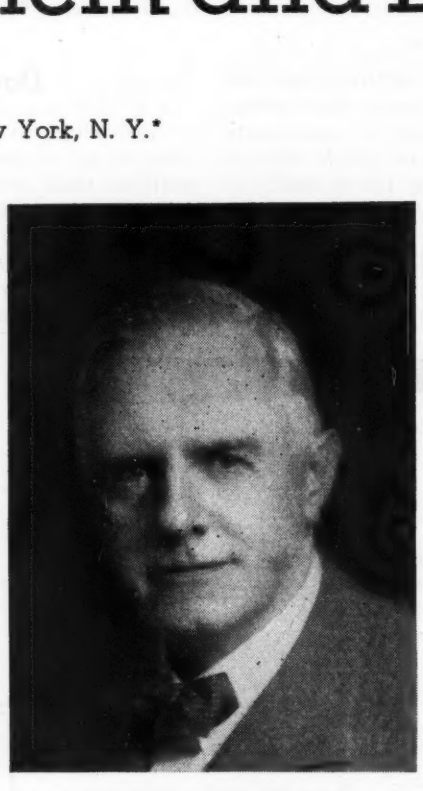
KOREA is rich in mineral resources. In an area of about 85,000 square miles, slightly larger than Great Britain or Utah, are hundreds of mineral operations, employing more than 220,000 men.

Gold production in 1940 was about one million ounces, and total mineral output had a value of possibly $250,000,000. The actual value of output is difficult to determine, as Japanese statistics for years have omitted all reference to several minerals which are known to have been produced in large amounts.

Korean History

According to legend, Korea was born in 2333 B. C. For four thousand years it isolated itself from the rest of the world and was known as the Hermit Kingdom. In 1592 it was invaded by the Japanese, who were defeated and driven out after seven years of warfare. Its isolation was finally ended, first in 1876 by Japan, and by the United States in 1882. During that year the United States entered into a mutual-aid treaty with Korea, in which Korean independence was assured by a solemn declaration. Notwithstanding this, President Theodore Roosevelt, without the slightest reference to this treaty, abandoned Korea to Japan in 1905 as an incident to the settlement of the Russo-Japanese war, permitting Japan to establish a "protectorate" over Korea.

*Mineral Adviser, The Provisional Government of the Republic of Korea.



SAMUEL H. DOLBEAR

Although Japan had repeatedly guaranteed Korean freedom in treaties with that country and with Russia, Great Britain, and China, actual annexation followed in 1910. Overconfidence in the integrity of stronger nations in the observance of treaty obligations was rewarded by the loss of independence. Evidently treaties were in some cases "scraps of paper" before that frank characterization by the Germans in 1914. There was, of course, resistance in Korea to this loss of sovereignty, and the struggle for freedom has gone on underground and above for 40 years.

Japanese annexation brought not only a domination of government but also of industry. Major industrial enterprises became Japanese enterprises with Japanese management. Few Koreans have been permitted to occupy controlling positions in either industry or government. Engineering education for Koreans was frowned upon, and no Korean engineer could find employment in Japanese-controlled enterprises. Koreans with professional aptitude became lawyers or doctors.

Foreign mining operations were carried on before the Japanese advent, under concessions granted by the former Korean emperor. The principal gold mines were controlled by American, British, and French capital. In 1916 the Japanese adopted laws prohibiting further foreign operation, although they continued to respect concessions of the former Korean emperor.

In 1936, foreign operators began to feel Japanese pressure to compel the sale of foreign properties. This took the form of increasing taxes, difficulty in obtaining import permits for supplies and equipment, and similar obstructions. By the end of 1939 all foreign mining operations had been purchased by Japanese concerns, including Oriental Consolidated Mining Corporation, an American company with a long and profitable history.

This much of Korean history is necessary to an understanding of the past and the future of Korean mineral industries when Korea comes into possession of the freedom specifically promised her at the Cairo conference by Great Britain, China and the United States.

Mineral Resources

Technical literature is strangely deficient in facts about Korean mineral resources and industry. Most published data have been written by former foreign employees of foreign companies, and these are limited to descriptions of foreign operations. This is the result of Japanese policy. Statistical material released by the Japanese-controlled Governor General of Chosen covers the production of some but not all minerals and metals. However, many of these figures are confusing, as, for example, years in which reported production of pig iron have shown amounts approximately the same as those for the production of iron ore. And there are a large number of cases

in which exports have far exceeded production.

Although the accompanying list of Korean minerals is impressive, it is far from complete, as it omits various mineral materials which in the United States comprise an important part of our mineral output. Omitted here are crushed rock, sand and gravel, dimension stone, feldspar, clay and kaolin, gypsum, limestone, silica, and others known to be produced.

Postwar Outlook

Inasmuch as all important parts of Korea's industries are at present directed by Japanese executives and engineers who are unlikely to remain after Korean independence, V-K Day is likely to witness a general cessation of industrial activity pending the provision of new management. Any protracted closure would bring serious privation to hundreds of thousands of Koreans existing today in an economy which has furnished little opportunity to provide for "rainy days."

It is important, therefore, that plans be developed in advance so that operations may be resumed with a minimum of delay. This is a task of serious proportions.

In the United States 7.8 percent of all employees of the mineral industry are classified by the Department of Labor as professional, semi-professional, proprietors, officials, etc. (not including foremen). If this ratio were applicable to Korea it would involve the provision of over 17,000 men in this group. Although this number is probably too high for Korean conditions, the task is nevertheless one of such size that its complete solution cannot be accomplished quickly.

Executive and technical forces must be found for several hundred mineral enterprises, and when they have been established there must be time for becoming familiar with mines and plants. New managements and operating personnel will have to be assembled and trained. The present Japanese operating plans and data would be of very limited use under changed conditions.

Where can the necessary help be found? Certainly the maximum use must be made of Koreans who have technical or administrative ability. They will have to take on greater responsibilities than they have had before. Korean executives have not been permitted in the past to direct these operations, the more impor-

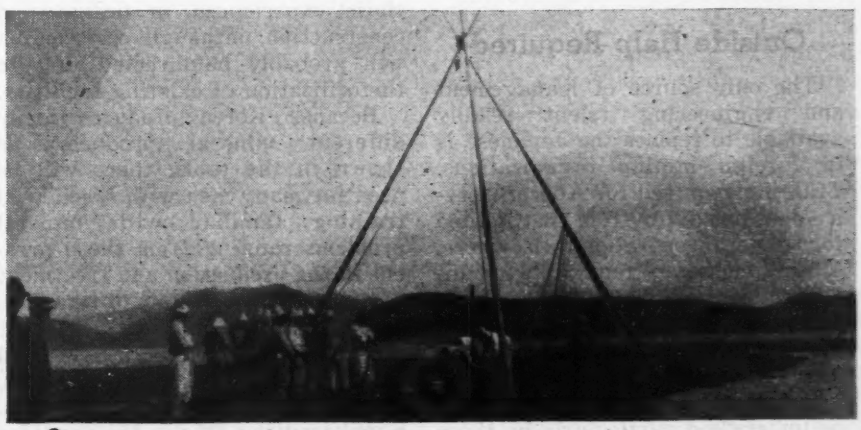
KOREAN MINERAL RESERVES AND OUTPUT

Substance	Reported Reserves	Latest Reported Output Metric Tons (Except as Noted)	Year
Aluminum		12,000 tons	1943
Antimony		Small	
Alunite	20-30 million tons	149,000 tons	1937
Arsenic (white)		230 tons	1934
Barytes	1,000,000 tons	15,729 tons	1938
Briquettes (coal)		215,465 tons	1937
Cement		676,500 tons	1937
Coal—			
Anthracite	1.3 billion tons	2,064,000 tons	1939
Soft	409 million tons	4,481,000 tons	1939
Coke		201,840 tons	1935
Copper		2,170 tons	1935
Diatomite		4,500 tons	1938
Fertilizer (mineral)		3,844,000 yen	1937
Fluorspar	1,000,000 tons	34,207 tons (*)	1938
Gold		975,000 Tr. oz.	1939
Gold ores		6,681,000 yen	1939
Gold-silver-copper ores		51,697,000 yen	1939
Gold-silver-lead ores		7,607,000 yen	1939
Graphite		78,501 tons	1939
Iron ore—		400,000 tons	1939
High grade	10-40 million tons		
Low grade	1 billion tons		
Iron, pig		200,000 tons	1939
Steel		87,000 tons	1936
Lead		5,850 tons	1937
Lithia (amblygonite)	10 million tons		
Magnesite, crude	3 billion tons	450,000 tons (†)	1942
Magnesite, dead burnt		35,000 tons (†)	1939
Magnesite, brick		7,000 tons (†)	1939
Magnesium		3,000 tons (†)	1941
Mercury		Small	
Mica		70 tons	1937
Molybdenum		29,000 lb. Mo.	1930
Nickel	"Vast"		
Petroleum		21,546,000 yen	1937
Phosphates (apatite)	100 million tons	60,000 tons	1941
Pyrites		55,611 tons	1935
Salt		200,000 tons	1933
Tungsten ores (60% WO_3)		2,596 Sh. tons (*)	1939
Zinc ores		18,000 tons (†)	1943

(*) Exports.

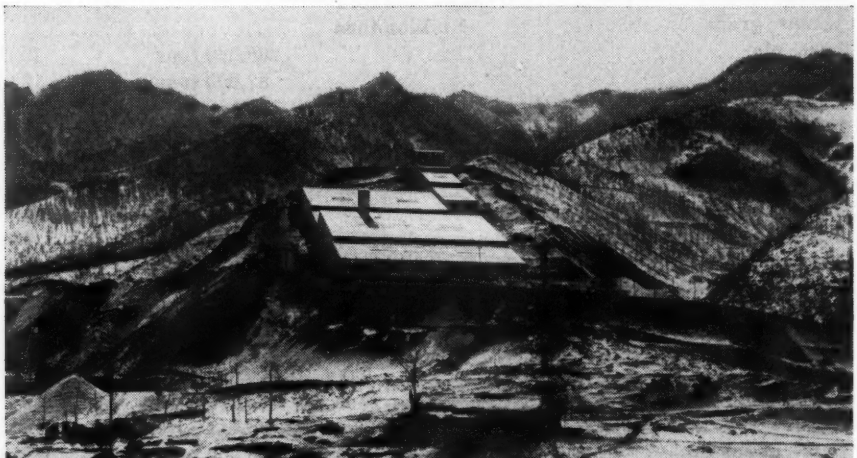
(†) Projected capacity.

Source: Production and export statistics largely from publications of U. S. Bureau of Mines. Others: From miscellaneous sources.



Drilling placer ground. The 15 men on the left compose the power plant.

The native miners are capable workmen. Main shaft of Chosen Corporation mine near Tayudong, north Heian province.



New concentrator of Chosen Corporation, Tayudong, north Heian province, operated by a British-"controlled" Japanese company.

tant positions having been allocated to Japanese.

Outside Help Required

The only source of management and engineering talent readily available to replace the Japanese is in foreign mining organizations. Training required for Korean service does not differ from that needed for mineral operations elsewhere. Mining engineers familiar with underground and surface operations are, of course, needed; ore-dressing problems are generally similar to those found elsewhere; executive problems are also similar and will be understood particularly by those who have had experience in other parts of the Orient. Plant construction will ultimately call for those experienced in design and construction, although early effort will probably be directed first to the utilization of existing facilities.

Because Korea produces many different mineral products, as shown in the table, there will be need for many men with specialized training familiar with mineral problems ranging from those present in the production and treatment of alunite, at the top of the list, through zinc, at the end. Some of these call for metallurgists and chemical engineers, and there is, of course, the need for geologists. Supplementing this is the need for office staffs, draftsmen, and others included in any other well-organized operation.

Japanese Exploitation

Korean mineral industries in the past, except for some early mining concessions, have largely been developed only to the extent that they would fit into the pattern of Japan's economic and war plans. Korean raw materials and semi-manufactured mineral products have gone to Japan at prices so low that Korea has been deprived of much of the normal reward of production. No better example of this industrial discrimination can be found than the case of gold. Producers, including American and other foreign concerns, were compelled to sell their output to the Bank of Japan after 1934, at prices around $26 to $28 per ounce, contrasted to a world figure of $35. This was equivalent to a tax of 20 percent or more of gross production. Similarly, other mineral exports appear to have gone to Japan at prices far under those which might have been realized in an open world market.

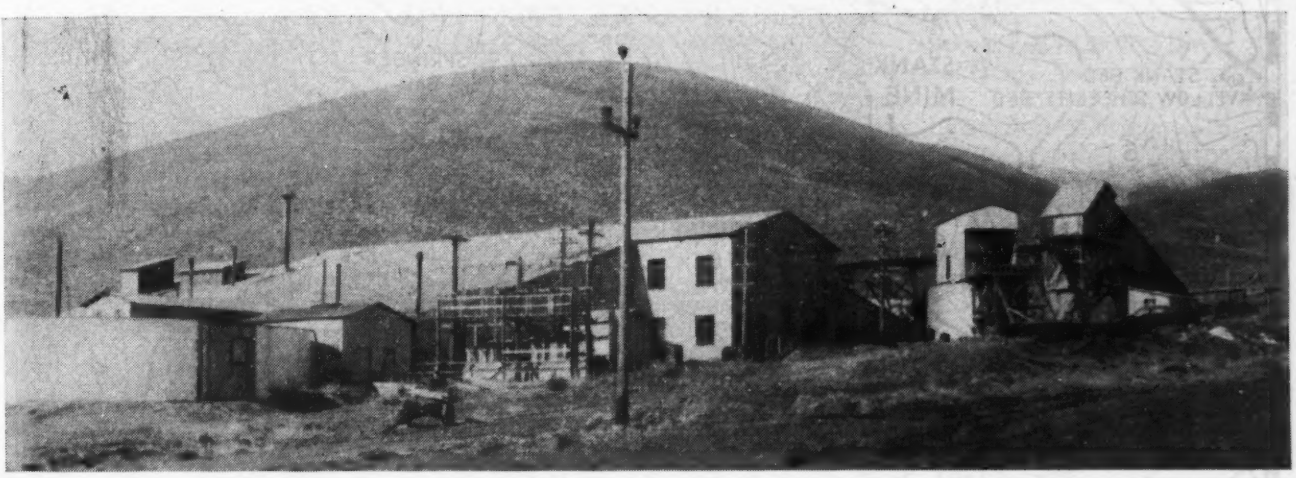
The imposition of these gross differentials in the mineral and other industries over 40 years of operations represents a huge sum; so large that if it were incorporated into any plan of reparations, it would form a weighty burden for Japan to carry. The amount would run into billions of dollars.

An Attractive Opportunity

The future of Korean mineral industries presents a major opportunity for cooperation between the Korean government and foreign capital and management on some equitable basis. It represents an opportunity for outside operators and engineers to participate in the development of industries which in many cases have been already explored, tested, and except for the possibilities of military destruction, may be found fully equipped, ready for further production. In few world areas are there parallel opportunities for outside capital management, and engineering.

Although no statement giving comprehensive details of a mineral policy has yet been announced by the Korean Provisional Government, the Korean Commission at Washington, of which Dr. Syngman Rhee is chairman, has authorized discussions leading to specific proposals for postwar operations in Korean mineral industries.

Nevada Tungsten Ore Gets Three-Way Treatment



Scheelite ore is treated in gravity, flotation, and chemical sections of the Nevada-Massachusetts concentrator, remodeled in 1944 to handle 350 to 400 tons a day. Concentrates contain plus 75 percent WO_3.

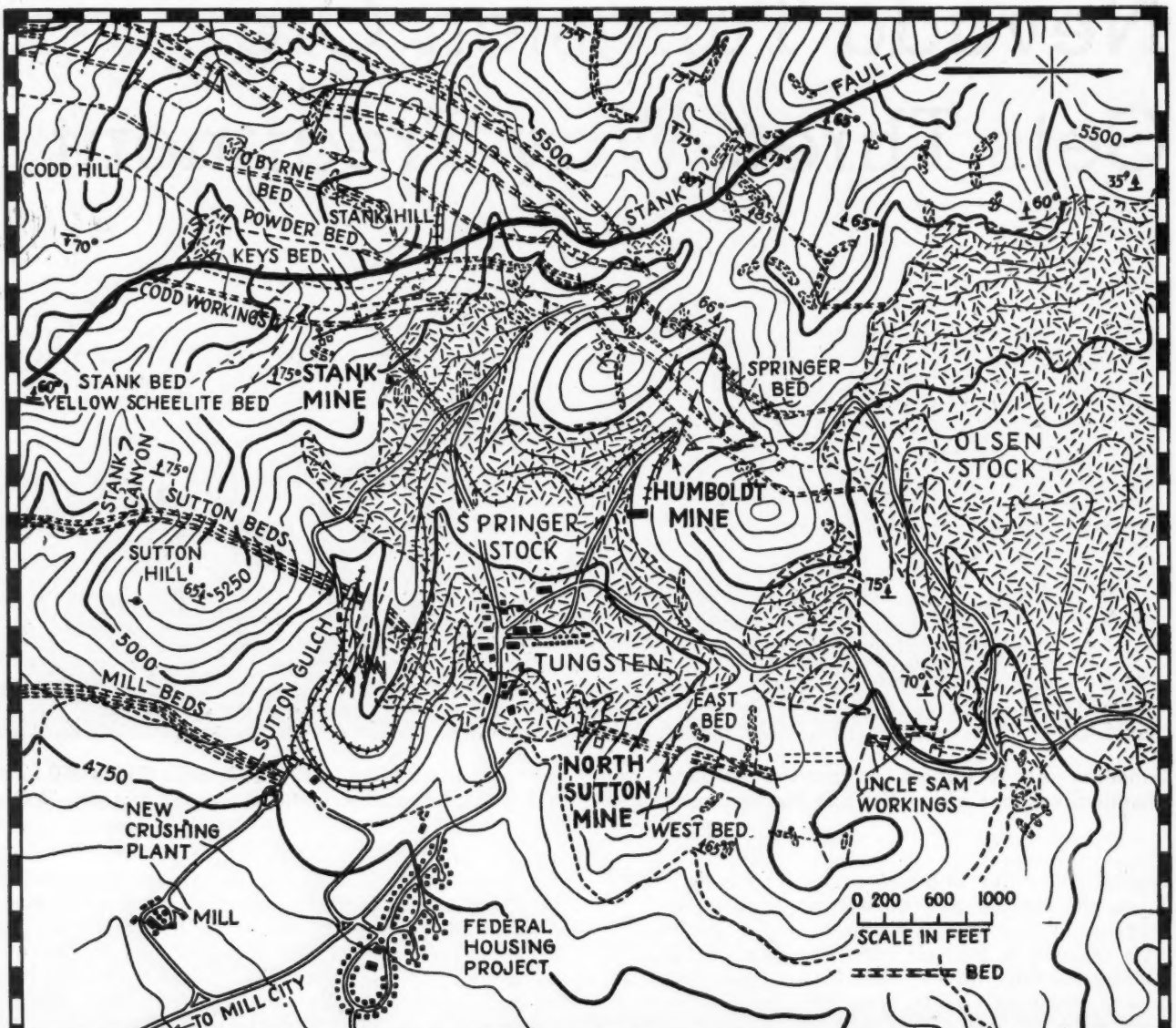
INTERESTING WORK is being carried on in the mining and milling of tungsten by the Nevada-Massachusetts Co., which controls extensive mineral holdings in the Mill City area of Pershing County, Nev. For more than 21 years this district has been one of the premier producers of tungsten concentrates in the United States, and because of the known large concentrations of the metal, it occupies an important world position. The deposits, now worked to a vertical depth of more than 1,430 ft. and considered the deepest in the United States, are about eight miles west of Mill City, situated on the eastern slope of the Eugene Mountains. Near the center of the area currently in production and at an elevation of 5,000 ft. is the camp of Tungsten.

The scheelite deposits were discovered in Springer Gulch, a short distance from the present camp, in 1917. Wartime demand for tungsten advanced development so rapidly that by 1918 three companies —the Humboldt Corporation, Pacific Tungsten Co., and Mill City Tungsten Mining Co.—were established and two mills were in operation. Activities ceased soon after the armistice because of falling tungsten prices. The mines remained idle until C. W. Poole leased the holdings of Pacific Tungsten Co. in 1924. In 1925 the Nevada-Massachusetts Co. acquired the properties of the Pacific Tungsten Co. and Mill City Tungsten Mining Co., and in 1928 those of the Humboldt Corporation. The Pacific mill, which was soon enlarged to 260 tons, operated until its destruction by fire on Nov. 11, 1943. On the same site a new crushing plant was erected, which started operations in July 1944. During 1941, a 1,000-ton plant was installed to re-treat old tailings below the Pacific mill. Work continued until exhaustion of the tailings dump in August 1944, after which the mill was remodeled to handle mine ore at the rate of 350 to 400 tons a day.

Geology of Area

Geological conditions in the area are shown in the accompanying map. Briefly, the district is underlain by Triassic shale of unknown thickness, with intercalated limestone and sandstone beds. Most of the shale has been metamorphosed to hornfels or slate. In places the limestone beds have been altered to marble and tactite, the latter being a highly complex metamorphic rock containing scheelite and varying amounts of quartz, garnet, epidote, calcite, pyrite, actinolite, molybdenite, pyrorrhotite, and others. The tungsten ores all contain varying proportions of these minerals. Tabular scheelite orebodies occur in silicified limestone beds, with hornfels on each wall, traversed at various points by granite, aplite, and hornblende dikes. Thickness of the beds varies from 3½ ft. on the Springer to 20 ft. on the Sutton bed now under exploitation. General strike of the bed system is N. 15 deg. to 20 deg. E. Save for those in the hanging wall of the Stank and Yellow Scheelite, which have an easterly dip, all beds dip westerly about 70 deg. Enrichment has been fairly uniform in the beds mined so far, and some have continued productive for more than 1,500 ft. in depth.

The area is faulted, and displacements vary from a few feet to more than 50 ft. The most interesting feature of faulting is what is locally termed "sealed faults." Intense silification of the fault zone has resulted in silification of some of the hornfels along the walls of



Geologic and surface map of Mill City area, Pershing County, Nevada.

the fault to such an extent that it is difficult to determine the positions and attitudes of "sealed faults." Presence of garnet and scheelite within the fault zone and the difference in hardness of the hornfels play a most important role in solving such a fault problem. The general mine-run ore from the limestone beds is a medium to coarse-grained aggregate of quartz, garnet, and epidote, with scattered crystals of scheelite. Some high-grade ore consists of scheelite crystals embedded in glossy quartz and fine-grained epidote. Values contained vary from 0.25 to 3 percent WO_3.

The limestone beds (shown on map) are worked through three separate mines known as the Stank, Humboldt, and North Sutton, a relatively recent development. Mine development in the Stank property covers the Yellow Scheelite bed, the Humboldt, the Springer and George beds, and the North Sutton, the East and West beds. The North Sutton mine is the chief producer. Since Pearl Harbor considerable progress has been made in mechanizing underground operations, especially in loading and tramming broken ore waste, and the work is being expanded at the rate necessary equipment can be obtained under present priority arrangements. See table of development work of mines.

Mining Method

Blocked-out ore is mined by shrinkage stoping. The general procedure is to drive a ventilation raise to the level above in conjunction with chute raises at 15- to 20-ft. intervals, and to install chutes. Chute spacing is determined by the character and moisture content of the ore. The 20-ft. spacing is used where the ore is dry. Next, a manway is started 75 ft. from the ventilation raise if the chute spacing is 15 ft., or 80 to 100 ft. if 20 ft. After the ventilation raise has reached the level above, and chute raises have been belled out to connect with each other, a manway is started at the other end of the block and stoping operations commence.

Stopes are mined by over-hand, horizontal, flat-back cuts. Normally each round is drilled vertically with self-rotating stopers. However, if the ground is exceptionally hard, the holes in the rounds are drilled horizontally with drifters. The cut is advanced simultaneously from both ends of the block, one miner proceeding from the ventilation raise while a second starts from a

manway at the other end. The manway is raised periodically as the stope extends upward. A distance of about 6 ft. is maintained between the top of the broken ore and the back of the stope by carefully drawing off excess material. Stopes are carried to within 6 ft. of the floor of the level above, under which a floor pillar is left until the work on the level is completed. The pillar is removed by underhand stoping if the stope is filled with waste, or blasted down and the ore drawn off at the level below if the stope is empty. A small amount of slushing is done in the stopes, principally at points where the orebody terminates along flat-dipping faults and dikes. Equipment used in this work includes I-R double-drum air and electric slushers and Pacific and Holcolm scrapers.

Crushing Plant and Mill

The new crushing plant is situated a short distance from the site originally occupied by the old concentrator. See flowsheet and equipment list. The minus-⅜-in. product of the crushing plant goes to a circular steel storage bin for subsequent transportation by trucks to the steel storage bin at the head of the mill, about ¼ mile below the crushing plant. This practice will be discontinued as soon as belt conveyor equipment can be obtained.

Several unique features are incorporated in the mill flowsheet, including automatic control equipment. For instance, tungsten is recovered both by gravity and flotation methods, the concentrates respectively being given a roaster-magnetic separator and acid treatment to provide a final product assaying plus 75 percent WO_3. The pH is controlled automatically with a Beckman Model R indicator connected to a Bristol throttling type controller, with the diaphragm operating a variable transformer (Variac), which in turn regulates a Jeffrey vibrating feeder handling soda ash.

The ore treated does not carry a large amount of fluorspar, a mineral almost impossible to separate from scheelite with conventional fatty acid reagents. However, the ore does contain 12 to 13 percent calcite, which is rejected by careful reagent and pH control. Reagents used are soda ash to maintain a pH of 10 to 10.1; sodium silicate; a collector mixture of oleic acid; Alastoil B.T.O. and Alastoil LL; quebracho to help depress cal-

DEVELOPMENT WORK

Total development work completed thus far at the Stank, Humboldt, and North Sutton mines includes approximately 12 miles of tunnels, drifts, and crosscuts; 4,600 ft. of shaft; and over 16,000 ft. of diamond-drill work. Shaft installations are as follows:

Humboldt mine. Inclined shaft, 1,700 ft. (1,430 ft. vertical); hoisting compartment, 4½x4-ft.; manway, 3½x4-ft.; 15 levels, at 100-ft. intervals down to 1,300-ft. horizon, and 125-ft. intervals below that; steel headframe; skip, 1-ton operating on 16-lb. rails; hoist, 125-hp., Vulcan Iron Works.

Stank mine. Shaft, two-compartment, vertical down to 700 level; winze from 700 to 1,200 level; five active levels above 700 and three below 700, all at 100-ft. intervals; skip, 1-ton; wooden headframe; hoist, 80-hp., Vulcan Iron Works; hoisted ore is trammed in 16-cu.ft. end-dump cars to incline gravity-tram bin 800 ft. away, and then lowered in end-dump skips to storage and loading bin on narrow-gage track leading to new crushing plant.

North Sutton mine. A 1,200-ft. tunnel, two-compartment incline shaft, same dimensions as Humboldt shaft; two levels below tunnel level at 125-ft. intervals.

MINING OPERATIONS AND EQUIPMENT

Diamond drilling. C-P drills with E-X bits for exploration.

Drifting. I-R DA-30 and 35 drills, 1¼-in. hollow round steel, Jackbits.

Sinking. I-R X-59 Jackhamers.

Stoping and Raising. I-R R-48 and 58 self-rotating stopers, 1-in. quarter-octagon steel Jackbits.

Blasting. Gelatine dynamite, 35-percent, in stopes and development headings; 50-percent gelatine dynamite in very hard ground; electric detonators in shaft, conventional fuse and primers in other workings.

Haulage. Locomotive, Mancha storage battery; cars, rocker type, 16-cu. ft., end-dump; tracks, 20-lb. rail on 18-in. gage for haulage and tunnels, 12-lb. on 18-in. gage with ¾-percent grade in favor of the load in other workings.

Pumping. Flows of 50 g.p.m. in the Stank and Humboldt properties, and 300 g.p.m. in the Stank mine are pumped with I-R and F-M single- and twin-stage pumps equipped with automatic float control.

Ventilation. Natural except in dead-end workings, where Jeffries and Coppus blower units are used with canvas and metal tubing.

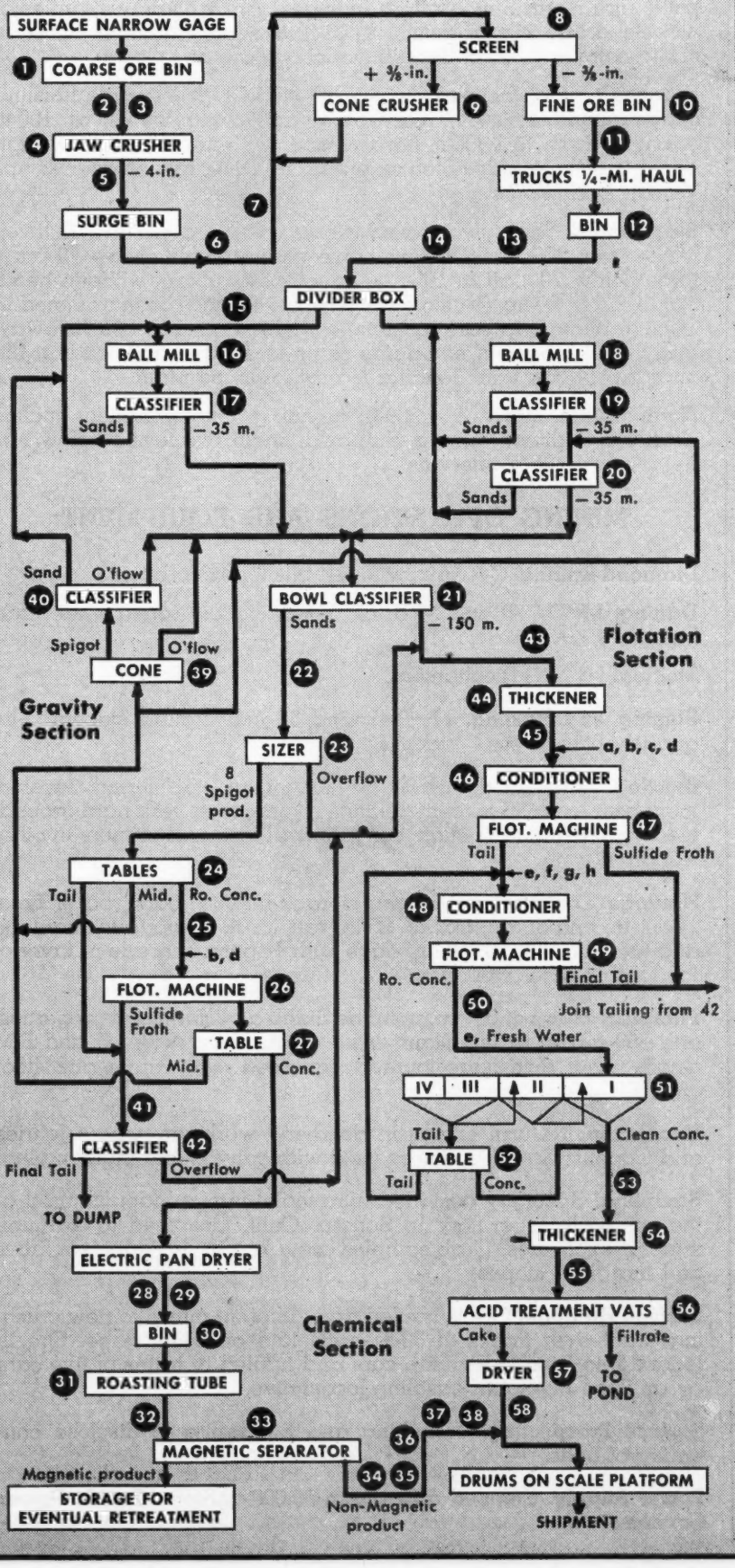
Sampling. Specially designed ultra-violet lamps manufactured at the company laboratory in Sonora, Calif., are used to examine mineral exposures. Grab samples are taken in development faces and marginal stopes.

Surface Haulage. Ore is hauled from different mines to new crushing plant over tracks of 30-lb. rails laid on 24-in. gage. Ore is loaded into 5-ton side-dump cars and hauled in trains of five cars by an 8-ton Plymouth gasoline locomotive.

Surface Prospecting. Trenching and bulldozing to disclose continuity of beds.

Power Supply. Stepped down from 60,000-v. Sierra Pacific Power Co. line.

CRUSHING PLANT AND MILL
NEVADA-MASSACHUSETTS CO.



LEGEND

1. Coarse ore bin, 150 tons, rillable ore
2. Ross chain feeder No. 4
3. 30-in. picking belt
4. Allis-Chalmers Superior jaw crusher, 24x36-in.
5. Inclined belt conveyor, 24-in.
6. Jig back belt conveyor, 24-in.
7. Dings magnetic pulley
8. Symons rod-deck screen, 4x8-ft.
9. Traylor TZ cone crusher, 3-ft.
10. Steel fine ore bin, 18x32-ft.
11. Belt loading feeder, 24-in.
12. Steel tank bin, 26x18-ft.
13. Two Hardinge Feedometers, size C
14. Inclined belt conveyor, 18-in.
15. Inclined belt conveyor, 18-in.
16. Marcy 66 ball mill
17. Dorr DSF classifier, 6x25-ft.
18. Marcy 64½ ball mill
19. No. 1 compartment Wemco classifier, model B.H., 8-ft.
20. No. 2 compartment
21. Dorr DSFB bowl classifier, 8x33x19-ft.
22. Wilfley pump, 4-in.
23. Fahrenwald sizer, 8 pocket
24. Eight No. 6 Wilfley tables
25. Wilfley pump, 1-in.
26. Kraut flotation machine, 3-cell
27. One No. 6 Wilfley finishing table
28. Bucket elevator, 3x3-in.
29. Screw conveyor, 6-in.
30. Steel bin, 3½-ton
31. Revolving roasting tube, 8-in.
32. Inclined screw conveyor
33. Dings magnetic separator, Type M
34. Bucket elevator
35. Storage bin
36. Drums
37. Hopper
38. Screw feeder
39. Dewatering cone, 3-ft.
40. Screw classifier, 18-in.
41. K K sand pump, 3-in.
42. Akins classifier, 5-ft.
43. Hydroseal pump, 6-in.
44. Two thickeners, 42x12-ft.
45. Dorrco Quadruplex diaphragm pump, 4-in.
46. Conditioner, 8x9-ft.
47. Agitair flotation machine, 6-cell, 36-in.
48. Conditioner, 10x11-ft.
49. Agitair flotation machine, 8-cell, 36-in.
50. Wilfley pump, 2-in.
51. Denver "Sub A" flotation machine, 4-cell, No. 18
52. Deister Overstrom table
53. Bucket elevator
54. Thickener, 20-ft.
55. Dorrco Simplex diaphragm pump, 2-in.
56. Air agitated acid treatment vats
57. Revolving dryer, 3x14-ft.
58. Chain bucket elevator

REAGENTS

To first conditioner in flotation section

- a. Soda ash
- b. Cresylic acid
- c. Kerosene
- d. Xanthate

To second conditioner in flotation section

- e. Sodium silicate
- f. Quebracho
- g. Oleic mix
- h. Sodium cyanide

To cleaner cells in flotation section

- e. Sodium silicate
  Fresh water

To flotation cells in gravity section

- b. Cresylic acid
- d. Xanthate

cite; and sodium cyanide to depress pyrite that has failed to float in the sulphide section. Cresylic acid, kerosene, xanthate, and soda ash are added to the primary conditioner. The fatty acid collector mixture usually is varied somewhat between winter and summer to compensate partly for the changed froth conditions due to differences in pulp temperatures. As the dilution of rougher concentrate is important in cleaning operations, sufficient water is added at this point to assure a pulp containing 35 percent solids in the sulphide section in order to prevent a too thin pulp in the scheelite section.

Flotation Section

As shown in the accompanying flow sheet, ore from the grinding section goes to a bowl classifier, 21, which produces sands which are fed to the gravity section, and a minus-150-mesh overflow, which is fed to the flotation section. Sulphides are removed by flotation and discarded. The remaining pulp containing scheelite goes through rougher and cleaner flotation cells to produce a concentrate, which is elevated to a 20-ft. thickener, 54.

Chemical Treatment

Underflow from the thickener is pumped in batches to one of the acid treatment tanks or vats, 56, in the acid plant. The tank is fitted with a false bottom of silica brick, below which air at from 3- to 4-lb. pressure is introduced to agitate the charge. Next, commercial muriatic acid is added until calcite is consumed. This is followed by addition of another dose of acid in amount equal to 10 percent of the weight of the charge to dissolve apatite. Vacuum is then applied and the charge filtered and washed with water. Resultant cake is dried in a 3x14-ft. rotary dryer, 57, elevated by a chain bucket elevator to a storage bin, and loaded into metal drums for shipment to market. Filtrate goes to the tailings pond.

Gravity Section

The bowl classifier sands treated in the gravity concentration section of the mill are pumped from the classifier to an eight-pocket Fahrenwald sizer serving eight No. 6 Wilfley concentrating tables. Table concentrates are passed through a three-cell Kraut flotation machine to remove contained sulphides. Reagents added are cresylic acid and xanthate. Froth is pumped to a 5-ft. Akins classifier, while the tailings are passed over a No. 6 Wilfley fine table, which makes a garnet-scheelite separation, with the garnet cut into the tailings and the scheelite concentrates sent to the dryer-magnetic separator circuit. Rougher table tailings go to the Akins classifier mentioned previously, and middlings, together with those from the fine table, are pumped to either ball-mill circuit after treatment in the dewatering units shown in the flowsheet. Overflow from the Fahrenwald sizer returns to the thickeners in the flotation section. Use of the classifier equipment handling table middlings has obviated the installation of a regrind unit. Sands produced by the Akins classifier go via a wooden launder on a slope of $\frac{5}{8}$ in. to 1 ft. to the tailings dump, and the overflow is pumped back to the thickeners ahead of the flotation section.

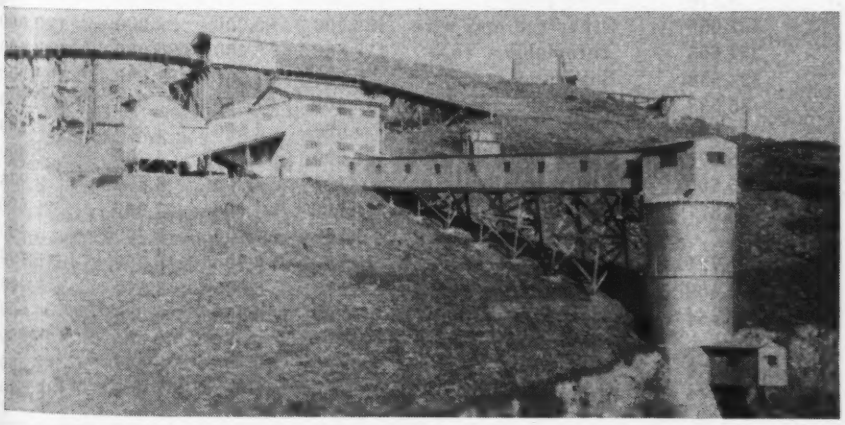
Final scheelite concentrates are dried on an electric pan dryer, elevated by a bucket elevator with 3x3-in. buckets, and conveyed by a screw conveyor to a steel hopper above an 8-in. rotary roasting tube externally fired. Roasting to eliminate sulphides that failed to float in the Kraut flotation machine is done at 700 deg. C. The roaster product is passed to a Dings Type M magnetic separator. Non-magnetic material is loaded into metal drums for shipment to markets, and the magnetic material is stored for eventual re-treatment. Concentrates contains plus 75 percent WO_3.

The method of assaying used at the mill laboratory is that evolved by the U. S. Geological Survey. It involves the use of a photoelectric colorimeter, and is based on a yellow color developed from a weak solution with caustic soda by the addition of stannous chloride, and then made acid with hydrochloric acid. The color develops in from $\frac{1}{2}$ to 1 hr. Results are quite accurate, especially on material containing less than 1 percent WO_3. In addition, a sample can be carried through from dry sample to the finished result in about 8 hr., in contrast to at least 48 hr. required with the conventional cinchonine method. Another advantage is the relatively small sample required, which weighs from 1 to 2 grams.

Dwellings for Workers

The new federal housing project, available for married workers and managed by Frank Fuss, Jr., includes 85 modern dwellings, a large recreation hall, and a grammar school. The company maintains a modern cash-and-carry store near the housing project, quarters for single men consisting of a number of one- and two-room houses, a cafeteria, a guest house, a garage, and a repair shop, all grouped around the general office. Water for domestic and plant use is obtained from two wells about three miles east of Tungsten.

Thanks are due to Charles H. Segerstrom, president, and Charles H. Segerstrom, Jr., vice president, for their permission to publish the preceding account; and to W. G. Emminger, general superintendent; Eldridge Nash, mine superintendent; P. McGuire, mill superintendent; and Heath B. Fowler, engineer, for their assistance. Other staff members include F. W. Jones, chemist; G. T. Myer, Jr., chief electrician; and William Wiedmaier, master mechanic.



Ore from three mines is shipped by rail to this crushing plant. Minus $\frac{3}{8}$-in. product is loaded into trucks from steel bin and shipped $\frac{1}{4}$ mile to the concentrator.

Copper: Immediate Prospects Favor Domestic Producers

H. H. WANDERS, Market Editor

THE COPPER INDUSTRY experienced its first real breathing spell in more than four years when V-E Day finally intervened early in May and activity for war production dropped abruptly. Cutbacks in the brass and wire programs were sharp. Though the pause was more or less expected, it caused considerable confusion in adjusting production and shipping schedules. However, it also provided some time for sober reflection on the state of the market. A report on the outlook for copper under prevailing unsettled conditions that would cover more than say the third quarter of 1945 would be a foolhardy task. Until the world gets back to catering to man's normal wants, and trade again flows freely, producers of copper, a world commodity, expect to conduct their operations on a short-term basis.

This war brought more controls into action than anyone thought possible. Now, in moving from a two-front to a one-front war, the process of undoing the restrictions is not going to be accomplished overnight. It will take time to get civilian production moving in volume. Minor bottlenecks will produce major headaches, possibly hampering a return to full civilian production until after the last shot has been fired. Tin, antimony, and cadmium, to mention a few metals, remain on the scarcity list, and will hinder production of such mass-production items as automobiles.

After living for several years with astronomical supply and requirements statistics that made sense only to the high command, the industry naturally is anxious to return to earth as soon as possible. However, a mixed war and peace economy, now in its early stages of formation, looks like a tough job to many in the industry. Partly because of growing impatience over hastening the process of dealing with your own customers instead of the Government, some operators are a little gloomy over marketing complications that are certain to come up in this half-and-half method of doing business. Most of the fears over distribution of copper are entertained by those charged with the actual selling of copper.

As the second half of the year opened, it was generally agreed that the copper outlook over the July-September period contained little of the disturbing nature so far as the domestic industry was concerned. Because of a pent-up demand for copper for civilian needs in the field of communications, public utilities, and transportation, a large tonnage of copper can be switched from war to peacetime production immediately. Moreover, the one-front war still calls for much metal.

Foreign production is expected to present a real problem should the Government decide to reduce its purchases. Contracts with foreign producers are not likely to be disturbed in the third-quarter period, but nothing is known of the

Production and Consumption of Copper in 1937

(American Bureau of Metal Statistics)

	(a) Production Tons	Consumption Tons
United States	834,835	878,186
Canada	262,432	61,508
Other America	(b) 571,495	9,370
France	1,100	132,056
Germany	32,518	251,655
Great Britain	.....	334,658
Italy	.....	85,538
Russia	101,963	173,061
Poland	.....	19,070
Sweden	7,669	55,666
Switzerland	.....	22,377
Yugoslavia	43,442	.....
Japan	83,665	201,721
Africa	(c) 416,328	4,409
Elsewhere	143,246	178,464
Totals	2,498,693	2,407,739

(a) Production chiefly from ore.

(b) Includes Mexico, Cuba, Newfoundland, Bolivia, Chile, Peru, and Ecuador.

(c) Includes Belgian Congo, Rhodesia, and South Africa.

Use of Copper in the United States

(Estimated by American Bureau of Metal Statistics)

	1937	1938	1939	1940
Electrical m'f'rs.	212,000	150,000	185,000	247,000
Telephone, telegraph	40,000	30,000	39,000	49,000
Light and power lines	83,000	62,000	67,000	74,000
Wire cloth	6,800	6,000	8,000	9,200
Other rod and wire	102,000	60,000	95,000	120,000
Automobiles (a)	112,000	55,000	85,000	103,000
Buildings	70,500	67,500	89,000	102,000
Castings	40,000	31,000	33,000	35,000
Clocks and watches	4,000	3,000	4,000	4,400
Copper-bearing steel	4,600	2,600	4,200	4,700
Radiators, heating	2,100	2,000	3,600	2,900
Radio	23,100	21,000	27,000	32,000
Railway equipment	7,100	1,700	2,700	5,700
Refrigerators (a)	13,500	6,700	10,000	10,500
Shipbuilding (a)	6,400	6,000	8,500	8,700
Air conditioning (a)	7,200	6,000	6,000	6,000
Ammunition	14,100	12,500	14,500	26,000
Other uses	66,600	46,200	67,600	81,500
Manufactures, export	45,000	38,800	51,900	148,400
Totals, tons	860,000	608,000	801,000	1,070,000

(a) Exclusive of electrical equipment.

Government's intentions after that period ends. The subject of foreign purchases is a delicate one, largely because of political and economic factors that must be weighed in modifying the purchasing program. Foreign copper was indispensable for our war requirements. At the same time, however, these purchases rendered material assistance to both business and governments throughout Latin America. Drastic action in reducing imports is not expected.

The disrupted state of industry in foreign countries that formerly absorbed much of the production of Chile, Peru, Mexico, Rhodesia, the Belgian Congo, and Canada naturally makes for nervousness among copper producers operating in those areas. Both Germany and Japan were heavy buyers of copper in the world market under normal conditions. In fact, in the years that preceded the war, buying by those countries increased and exerted a stabilizing influence in a market that was being amply supplied with copper from sources developed in recent years. Touching on the outlook for copper at a meeting of stockholders earlier in the year, Robert C. Stanley, chairman and president of International Nickel, said that prospects for the metal in a world of peace point to a slow recovery, owing to the large tonnage of scrap available and great war devastation existing in many countries. He declared that it is in Canada's interest that the government at Ottawa should endeavor to bring about a reduction in the 4c import tax imposed by the United States.

Until the highly industralized countries of Europe again consume copper in volume, or other countries, as Russia, step into the void left by Germany, Italy, and Japan, the marketing of production outside of the United States without wrecking the price structure calls for a large measure of cooperative effort. World production of copper probably averaged slightly more than 3,000,000 tons a year in the last four years. Consumption figures are not yet available. In 1937, a year of high production and consumption of copper, the world used approximately 2,407,739 tons. Output came to 2,498,693 tons.

A bright spot in the foreign market in recent months has been the eagerness with which selling agents abroad have approached producers in regard to resuming business relations severed in 1939. Inquiries for copper and copper products for export have been numerous, but a free flow of business has been hindered because of exchange restrictions, controls, and shipping difficulties. Export business accepted so far this year has been limited to military and essential civilian requirements. Eventually, Continental Europe will purchase copper on a large scale for reconstruction, but, until that market again absorbs from 500,000 to 600,000 tons annually, foreign production, greatly stimulated in the last decade, will encounter some rough going.

The domestic industry assumes that any surplus copper acquired during the transition period will be absorbed by the Government, either by Metals Reserve Co., so long as that agency exists, or by the military authorities for the emergency stockpile. Little is known in market circles about the ultimate size of this stockpile, but there is general agreement that the Army and Navy have asked that huge tonnages be set aside for the war chest. Intelligent handling of this undertaking could ease the task of balancing copper supply and consumption materially. Some producers favor stockpiling only copper produced in this country, but the problem of dealing with surpluses is complex, and this view is not expected to prevail. The stockpile measure as it stands permits of wide discretionary power in determining the character of the material that is to be stored in the reserve. It provides for accumulating both new copper and scrap.

Once the transition period has been left behind, the backlog of orders for replacement and new construction is likely to absorb more than average peacetime tonnages of copper. The electrical industry has been on a starvation diet for several years, and already substantial tonnages of copper are moving in that direction to meet pressing needs. No other metal is threatening to replace copper in electrical manufactures, communications, and the light and power industry. The war record of the brass industry has been fantastic, and no one was surprised when the sharp cutbacks came. But brass will continue to be used extensively for civilian production, possibly at a rate above the average of prewar years.

Prospects for increased export trade in copper products in the transition period are favorable, even though competition with Canadian and British interests is bound to increase. European manufacturers, particularly those of Germany, are in no position to offer resistance to those in a position to cater to the needs of the liberated nations and other copper-starved countries. In the event that the price of foreign copper declines, domestic manufacturers of semi-finished and finished products can maintain a strong competitive position by switching to bonded foreign metal.

The prospects for the summer period point to a reduced but still substantial volume of business for the domestic industry, at steady prices. After Government support slackens, foreign production will encounter a marketing problem and price unsettlement.

United States Copper Statistics

A summary of the latest copper statistics reported by members of the Copper Institute, in tons, follows:

	Production		Deliveries to Customers			Refined
	(a) Crude	Refined	(b) Domestic	Export	Total	(c) Stocks
1939	836,074	818,289	814,407	134,152	984,559	159,485
1940	992,293	1,033,710	1,001,886	48,537	1,050,423	142,772
1941	1,016,996	1,065,667	1,545,541	307	1,545,848	75,564
1942	1,152,344	1,135,708	1,635,236	.....	1,635,236	65,309
1943	1,194,699	1,206,871	1,643,677	.....	1,643,677	52,121
1944	1,056,180	1,098,788	1,636,295	.....	1,636,295	66,780
1945:						
January ..	73,799	67,726	145,904	.....	145,904	59,715
February ..	67,496	69,950	172,585	.....	172,585	57,142
March	76,537	76,395	218,488	.....	218,488	51,861
April	74,392	75,436	161,111	.....	161,111	55,453
May	74,249	85,319	139,203	.....	139,203	63,841

(a) Mine or smelter production or shipments, and custom intake including scrap. (b) Beginning March, 1941, includes deliveries of foreign copper for domestic consumption. (c) At refineries, on consignment, and in Exchange warehouses, but not including consumers' stocks at their plants or warehouses. (d) Corrected.

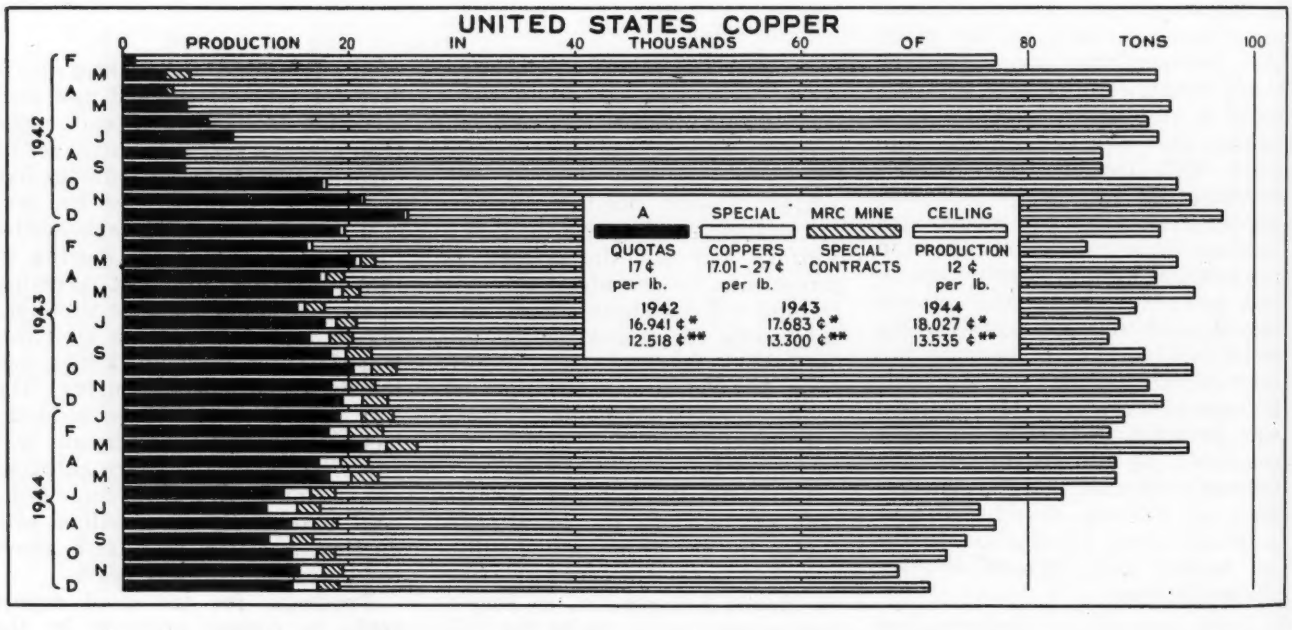
OPA Reports on Metal Premiums

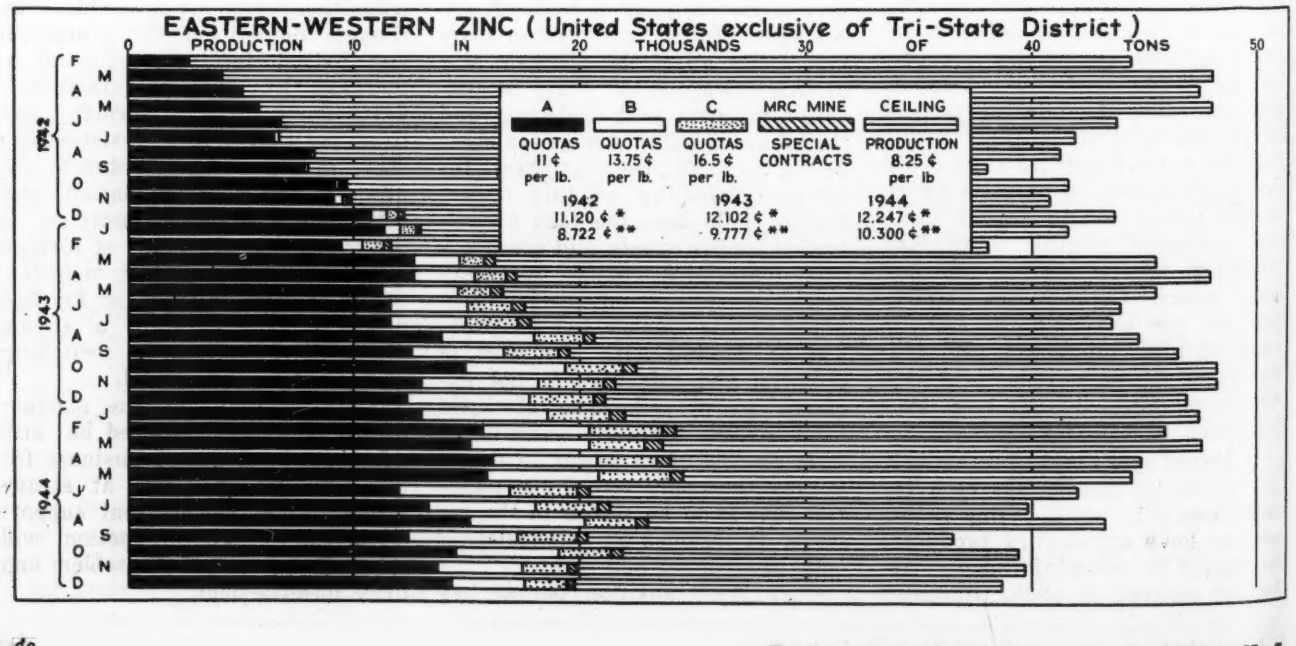
The following charts recording tons of domestically produced copper, lead, and zinc purchased at ceiling and over-ceiling prices were prepared by the Office of Price Administration. Over-ceiling payments include Metals Reserve subsidy payments to smelters and payments under special mine contracts.

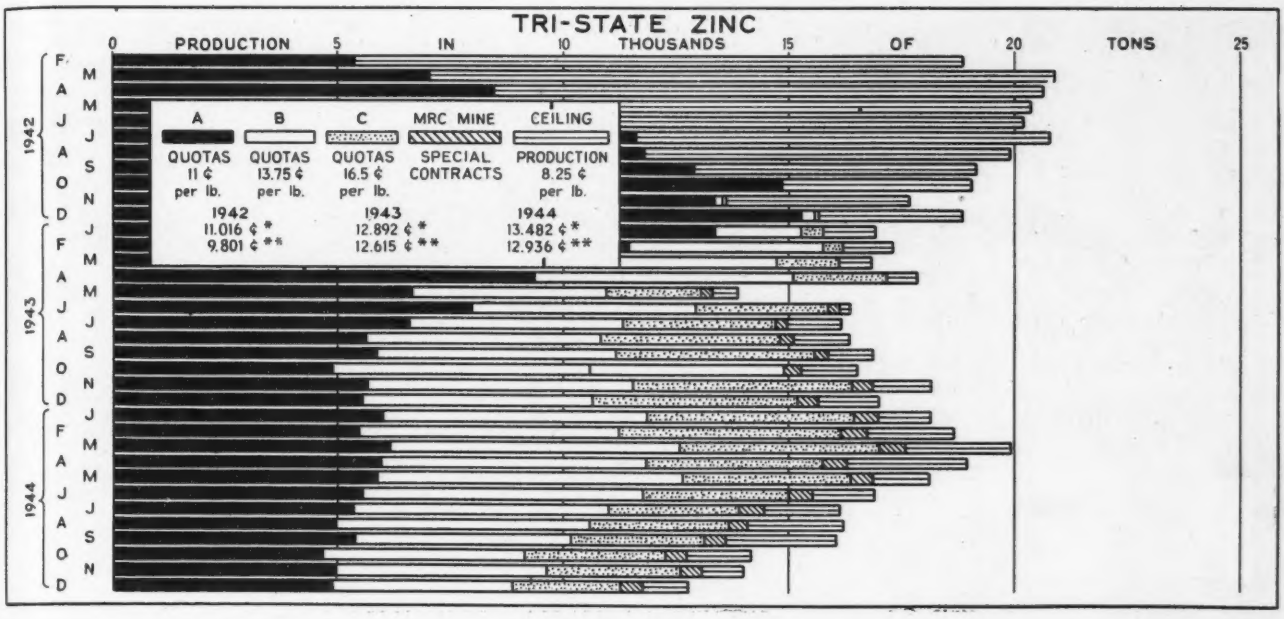
Domestic Production of Metals Under Premium Price Plan (In Tons)

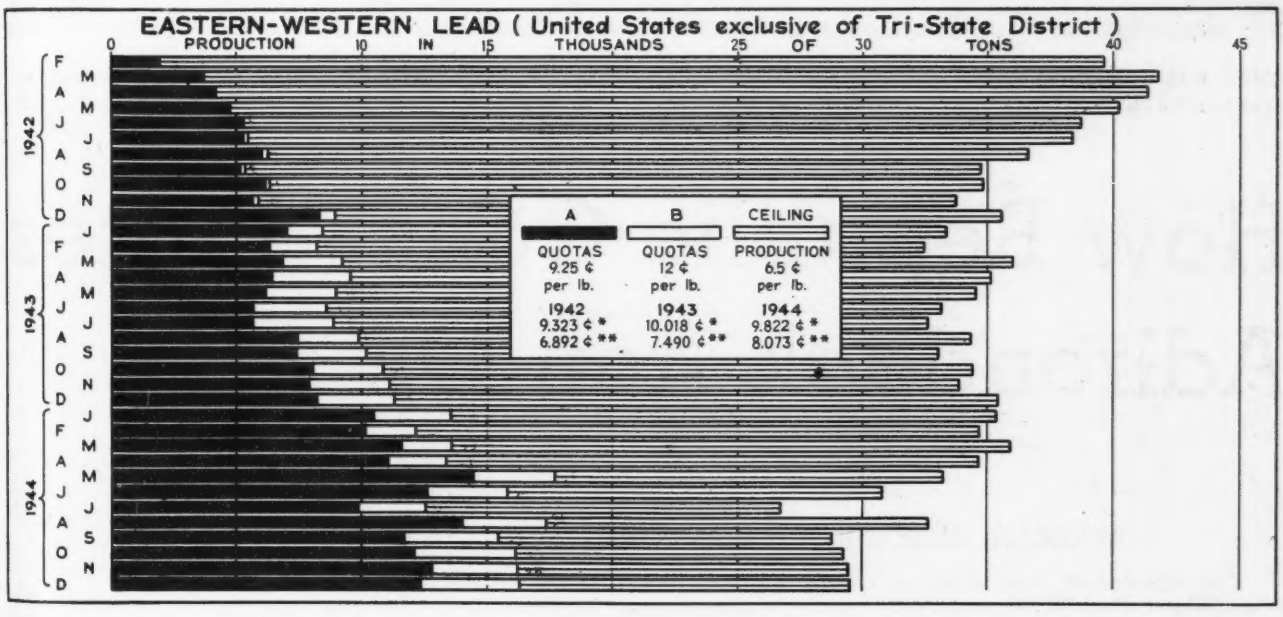
	Total Production	Produced at Ceiling Prices (a)	Percent of Total
Copper:			
1942 (Feb.-Dec.)	988,094	881,711	89.23
1943	1,090,818	841,286	77.12
1944	969,789	722,790	74.53
Zinc, exclusive of Tri-State District:			
1942 (Feb.-Dec.)	479,881	400,984	83.56
1943	540,565	326,250	60.35
1944	515,465	251,105	48.71
Zinc, Tri-State District:			
1942 (Feb.-Dec.)	216,367	95,050	43.93
1943	200,103	11,930	5.96
1944	200,341	20,911	10.44
Lead, exclusive of Tri-State District:			
1942 (Feb.-Dec.)	416,310	358,447	86.10
1943	409,170	294,001	71.85
1944	381,060	200,619	52.65
Lead, Tri-State District:			
1942 (Feb.-Dec.)	30,746	10,811	35.16
1943	34,830	1,863	5.35
1944	28,956	3,138	10.84

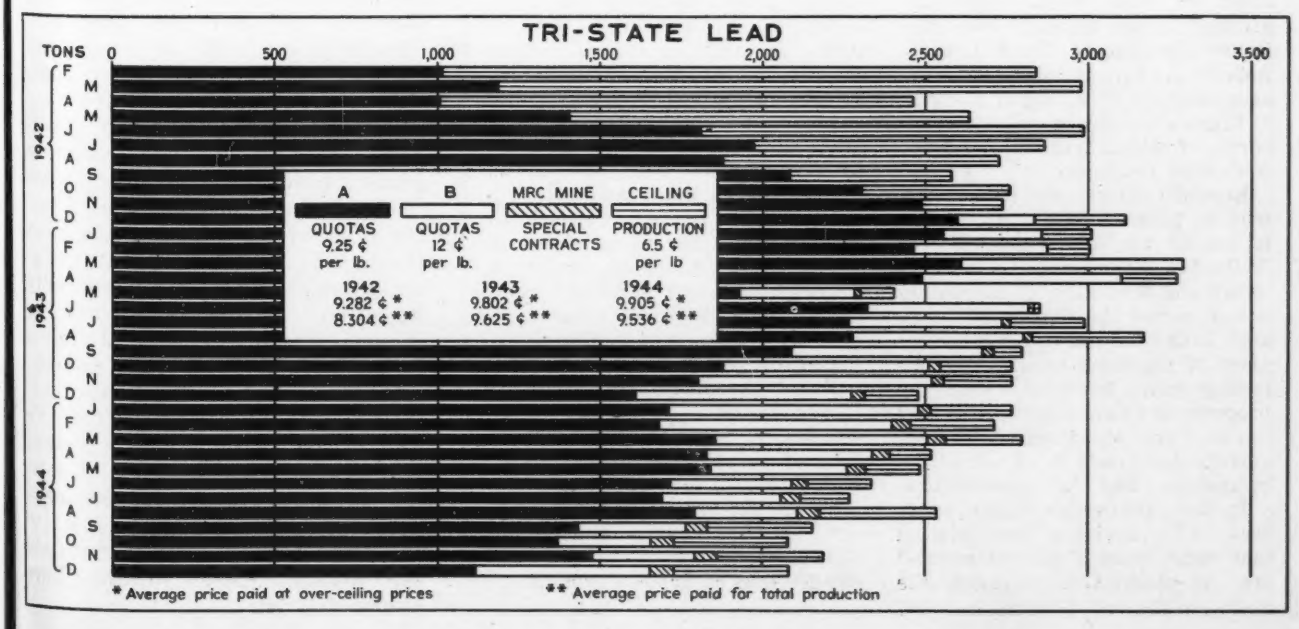
(a) Ceiling prices: Copper, 12c; zinc, 8¼c; lead, 6½c.






TRI-STATE ZINC
PRODUCTION IN THOUSANDS OF TONS
0 5 10 15 20 25
1942
1943
1944
J F M A M J J A S O N D
A
QUOTAS
11 ¢
per lb.
B
QUOTAS
13.75 ¢
per lb.
C
QUOTAS
16.5 ¢
per lb.
MRC MINE
SPECIAL
CONTRACTS
CEILING
PRODUCTION
8.25 ¢
per lb.
1942
11.016 ¢ *
9.801 ¢ **
1943
12.892 ¢ *
12.615 ¢ **
1944
13.482 ¢ *
12.936 ¢ **


EASTERN-WESTERN LEAD (United States exclusive of Tri-State District)
PRODUCTION IN THOUSANDS OF TONS
0 10 15 25 30 40 45
1942
1943
1944
J F M A M J J A S O N D
A
QUOTAS
9.25 ¢
per lb.
B
QUOTAS
12 ¢
per lb.
CEILING
PRODUCTION
6.5 ¢
per lb.
1942
9.323 ¢ *
6.892 ¢ **
1943
10.018 ¢ *
7.490 ¢ **
1944
9.822 ¢ *
8.073 ¢ **


TRI-STATE LEAD
TONS
0 500 1,000 1,500 2,000 2,500 3,000 3,500
1942
1943
1944
J F M A M J J A S O N D
A
QUOTAS
9.25 ¢
per lb.
B
QUOTAS
12 ¢
per lb.
MRC MINE
SPECIAL
CONTRACTS
CEILING
PRODUCTION
6.5 ¢
per lb
1942
9.282 ¢ *
8.304 ¢ **
1943
9.802 ¢ *
9.625 ¢ **
1944
9.905 ¢ *
9.536 ¢ **
* Average price paid at over-ceiling prices
** Average price paid for total production

FISHER HILL CONCENTRATOR, 3 miles from Port Henry and 3 miles from the Fisher Hill mine. The five storage bins at left deliver minus ¼-in. crushed ore to the rougher Linney magnetic separators on the top floor of the mill. See flowsheet on opposite page.

How Republic Concentrates Adirondack Iron Ores

REPUBLIC'S ADIRONDACK OPERATIONS

The Adirondack iron-mining operations of Republic Steel Corporation in New York State are grouped in two districts—the Port Henry District, in Essex County, Robert J. Linney, district manager; and the Chateaugay District, in Clinton County 50 miles further north, of which William J. Linney is district manager.

Republic entered the former district in 1938 as an operator when it leased the old properties of Witherbee, Sherman & Co. at Port Henry and Mineville. Subsequently it has opened the Fisher Hill mine and built the new beneficiating plant of the same name. The following year, Republic leased the property of Chateaugay Ore & Iron Co. at Lyon Mountain and subsequently purchased it. Each of the companies had a concentrator.

In these properties, Republic has ores, all requiring beneficiation that range from 25 percent iron and low in phosphorus, through the bessemer ores (not exceeding 0.045 percent phosphorus) running 35 percent iron and better, to high-phosphorus ore running 50 percent iron. In addition it has direct-shipping high-phosphorus lump ore containing 60 percent iron.

From these ores, concentrates are made of a general tenor of 68 to 69 percent iron, with phosphorus within desired limits and carrying very little moisture. Adjacent to each concentrator is a sintering plant. By these means and with a freight rate of $2.66 the company's finished products can compete with Lake ores in Cleveland-Youngstown-Pittsburgh district.

Rated capacities are: In Port Henry district: Mineville, 1,800,000 tons of crude ore and 1,000,000 tons of shipping product. Fisher Hill, 2,500,000 tons of crude, yielding 1,000,000 tons of shipping product. In Chateaugay district, 1,350,000 tons of crude ore and 450,000 tons of finished product.

THE FISHER HILL concentrator of Republican Steel Corporation, 3 miles from Port Henry, N. Y., stands as a monument to the company's wartime effort in the Adirondack district to help meet the abnormal demand for iron ore. Substantially built of steel and concrete, it is an important addition to the company's facilities for beneficiating the region's magnetite ores, which are assuming greater prominence as the reserves of Lake Superior hematites show the effect of the inroads made upon them. Equipped for wet magnetic concentration with a specially improved separators, vibrating screens, grinding mills, and filters, it produces a high-grade concentrate that when sintered in an adjacent plant can compete with Lake ores in the Cleveland, Youngstown, and Pittsburgh district. Credit for the novel features of the magnetic separators used belongs to Robert J. Linney, district manager for Republic Steel in the Port Henry district.

The plant was completed in 1943. It takes its name from the Fisher Hill mine, in the same area, to serve which it was erected. Diamond drilling 25 years ago is said to have proved the existence of 40,000,000 tons of milling ore in this deposit. Decision to reopen the orebody, which had last been worked in 1893, and to develop it for a production of 2,500,000 long tons of crude ore yearly, was made in September 1941, following which the headframe and mine surface plant were built, a four-compartment shaft was sunk, and the mine was brought into production. From the tonnage of crude ore specified the plant was expected to turn out 1,000,000 tons of finished product. Last year an older concentrator of the company at Port Henry was shut down because of insufficient labor supply and the crude ore feeding it was diverted to the Fisher Hill plant, in addition to what it was receiving from the Fisher Hill mine.

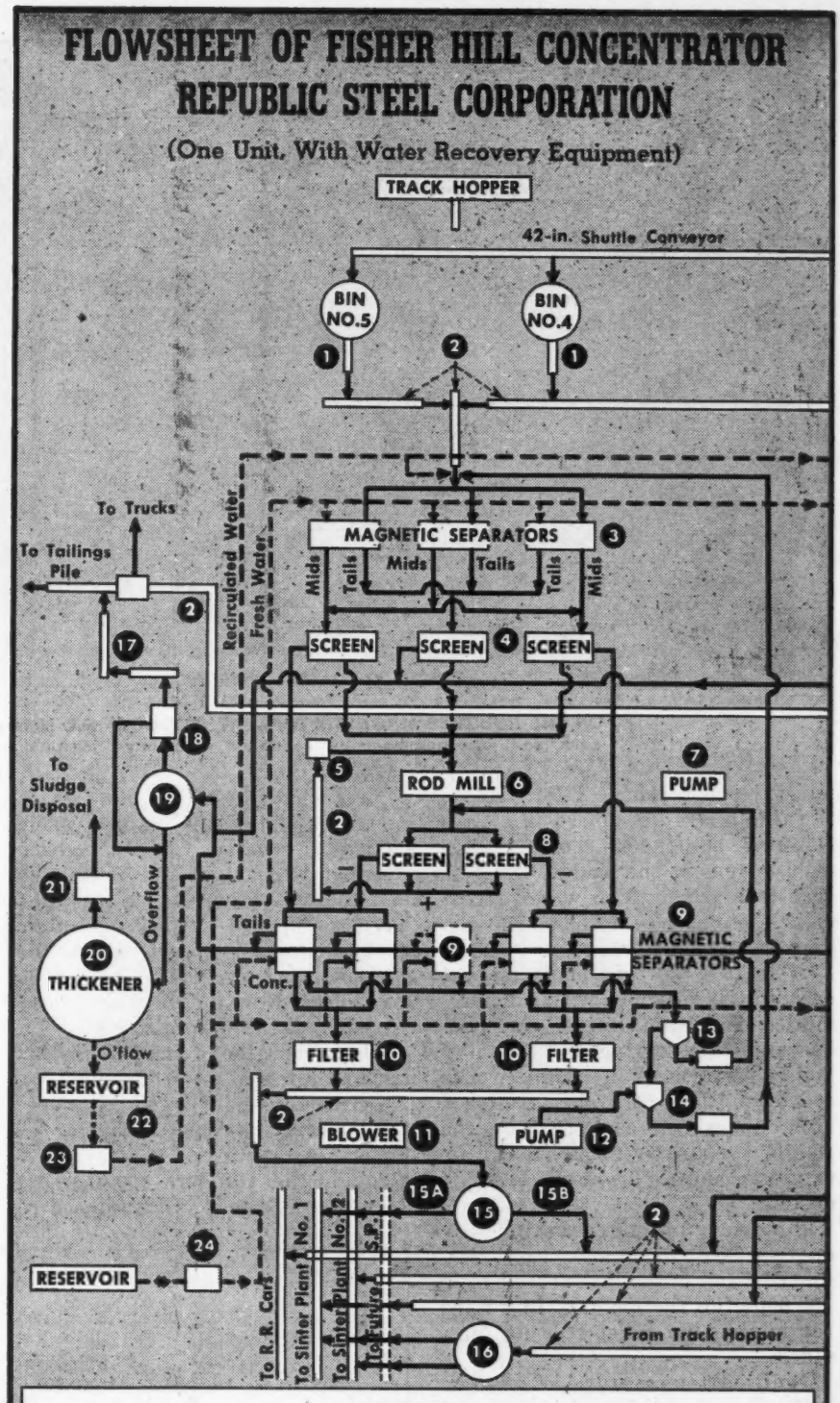
With its sintering plant the Fisher Hill concentrator is situated on Bartlett Pond brook, 3½ miles from the mine and 3 miles from Port Henry. To furnish an adequate amount of water for the wet milling selected, the local supply was supplemented with water from Lake Champlain brought in a 16-in. steel pipe line. Crushing is done at the mine. About 10 percent of the mill feed is here removed as waste with magnetic cobbers.

The ore, crushed to minus ¼ in., is delivered to the track hopper of the plant, and thence by a 42-in. conveyor to a shuttle conveyor of the same width. This distributes it to five 1,200-ton concrete bins, each with a 42x60-in. vibrating feeder, which delivers via a 20-in. conveyor system directly to the rougher magnetic separators of any of the three units.

The Mill Flowsheet

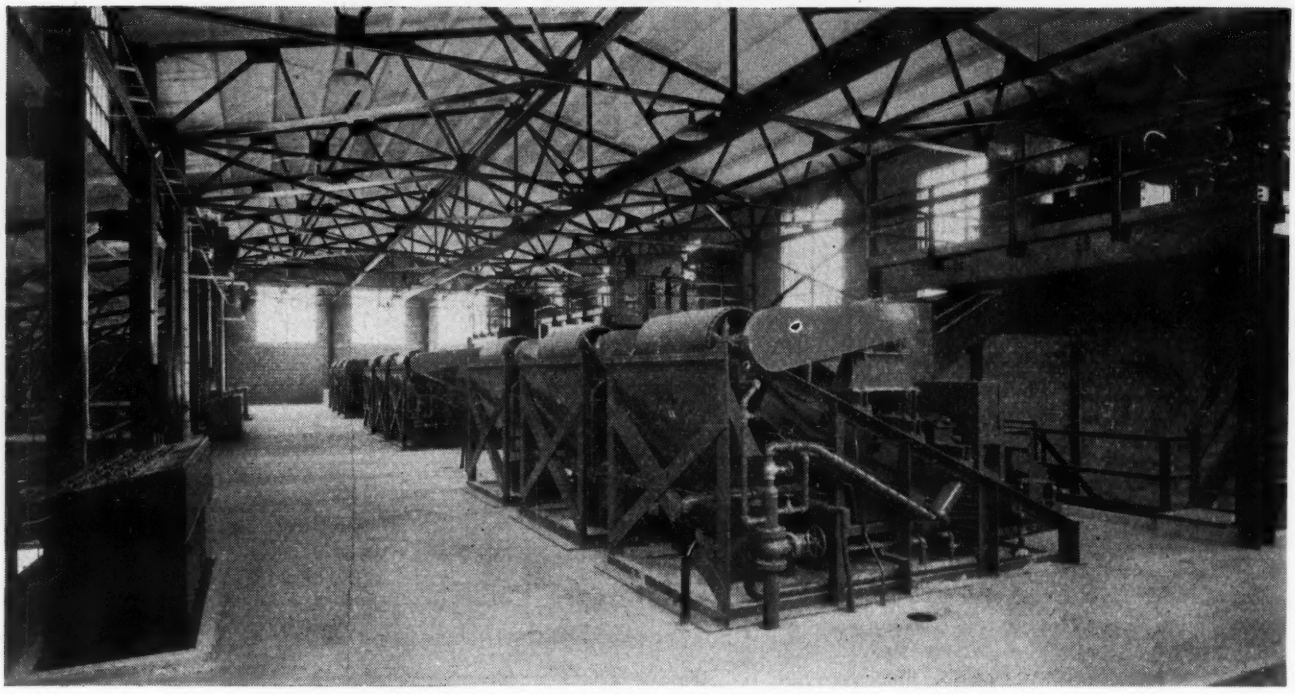
The flowsheet of one of these units is shown. The water recovery equipment serves all three units.

On each unit there are three Linney rougher wet-belt magnetic separators which make a final coarse tailing and a middling-concentrate. This is screened at 10 mesh. The oversize is ground in a rod mill in closed circuit with another 10-mesh screen. The minus-10-mesh products are combined and put over four finishing Linney separators. The finished concentrates are dewatered to 5 percent



LEGEND

1. 42x60-in. vibrating feeder
2. 20-in. conveyor
3. Three rougher Linney magnetic separators
4. Three 4x10-ft. vibrating screens, 10-mesh
5. Bucket elevator
6. 8x12-ft. rod mill
7. Vacuum pump
8. Two 4x10-ft. vibrating screens, 10-mesh
9. Four finisher Linney magnetic separators
10. Two 12-ft. 8-in. x 8-ft. Dorrco filters
11. Filter blower
12. Filtrate pump
13. Mids tank followed by 4-in. sand pump
14. Recirculation tank and 8-in. sand pump
15. Finished product storage bin
15A. Vibrating feeder
15B. Table feeder
16. Bin for storing culm for sintering received via 20-in. culm conveyor from track hopper
17. 24-in. conveyor
18. Rake classifier
19. Hydroseparator
20. 200-ft. dia. thickener
21. 4-in. sand pump to sludge disposal
22. Recirculating water reservoir
23. Four 2600-g.p.m. pumps
24. Two 1200-g.p.m. pumps delivering to fresh water reservoir



ON THE ROUGHER MAGNETIC SEPARATOR FLOOR, nine Linney machines (three to each unit) are automatically controlled from three pushbutton desks at the left.

moisture on a Dorrco filter.

Tailings are dewatered in a rake classifier, and the overflow is thickened to remove the sludge, which is sent to a pond. The water recovered is pumped to a 25,000,000-gal. dam for storage.

A feature of this plant is that each unit is provided with full automatic pushbutton control, the various steps of starting and stopping being performed in their proper sequence. This control is exercised from a desk on each unit on the rougher separator floor. It can be exercised out of sequence also, if desired.

Sintering is done continuously on two 72-in. machines, each having 14 wind boxes and served by a 100,000-cfm. suction fan. Pug mills for mixing the pallet feed are provided.

Ignition temperature is 1,700 to 1,800 deg. F. A 7-in. bed is maintained and the pallets travel at 8 to 9 ft. per minute.

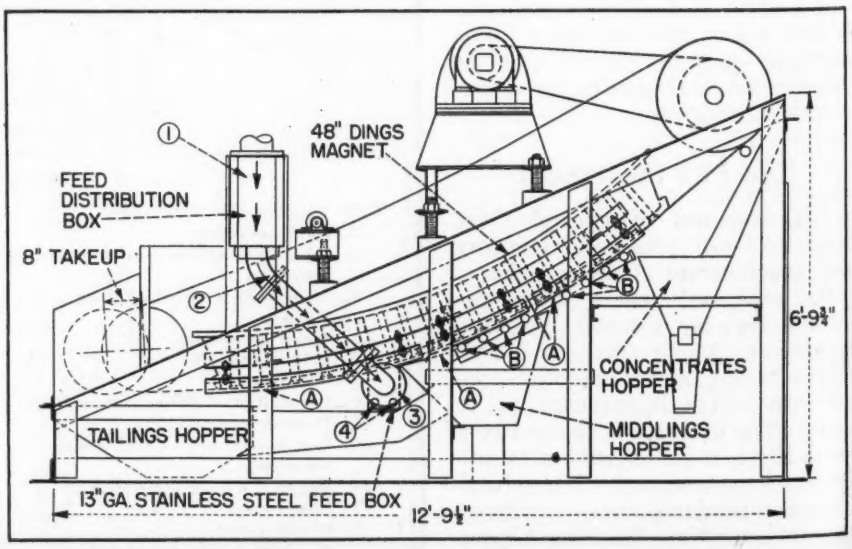
Concentrate can be bypassed and shipped without sintering. The amount thus handled depends on the demand. This sintering plant is not the neck of the bottle.

The Linney Separator

In an accompanying line drawing the details of the Linney magnetic separator can be studied. It has a 6x10-ft. sloping frame of heavy angle iron, the slope at the top being 30 deg. Mounted on this, a head pulley and a tail pulley carry an endless 54-in. belt made of rubber-covered two-ply canvas. Between the pulleys and within the belt there is a magnet 48-in. wide, having 20 coils wired in four groups, in any one of which the current can be varied. These coils are inclosed in an oil-filled stainless-steel case for protection.

The under side of the belt travels upward toward the head pulley.

Because of magnetite's high specific gravity, a large quantity of water is required to carry it through the launders to the separators. The feed is introduced to the feed box marked (1) in the drawing containing approximately 50 percent water by weight. From here it flows by gravity through a pipe (2) to a distribution box (3). This box has a pipe at either end (4), which acts as an injector and by regulating pressure on either end makes for a perfect distribution over the entire width of the separator. This is essential for efficiency in any type of a magnetic separator. Further, the feed is introduced at right angles to the direction of flow of finished product and thereby does not tend to contaminate material already concen-



LINNEY MAGNETIC SEPARATOR. 1, Feed distribution box. 2, Pipe to lower distribution box. 3, Under belt. 4, Injector pipes. A, Pans under belt to catch waste. B, Spray pipes.

trated. Also, the belt is traveling upwards at 35 deg., which minimizes the amount of dirty water carried over into the concentrates. Water supplied by the spray pipes used for washing the concentrate as it is carried along the belt is about 75 g.p.m.

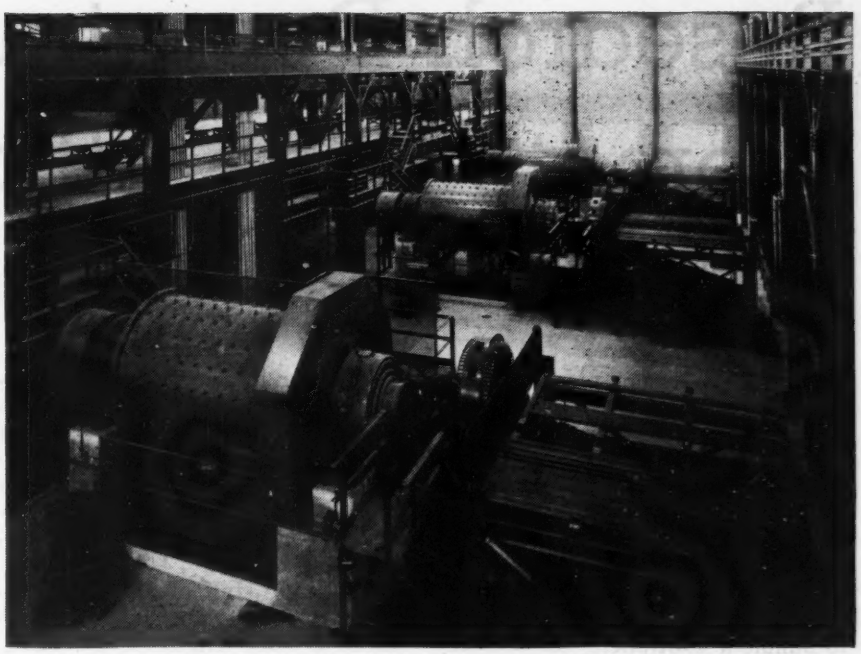
The pans marked *A* in the drawing are within the magnetic field at all times but still far enough away from the belt so that when the tailings or waste is separated out, it cannot again contaminate the finished product. Openings are also provided between these pans to get rid of the tailings and dirty water as rapidly as possible.

Washing Important

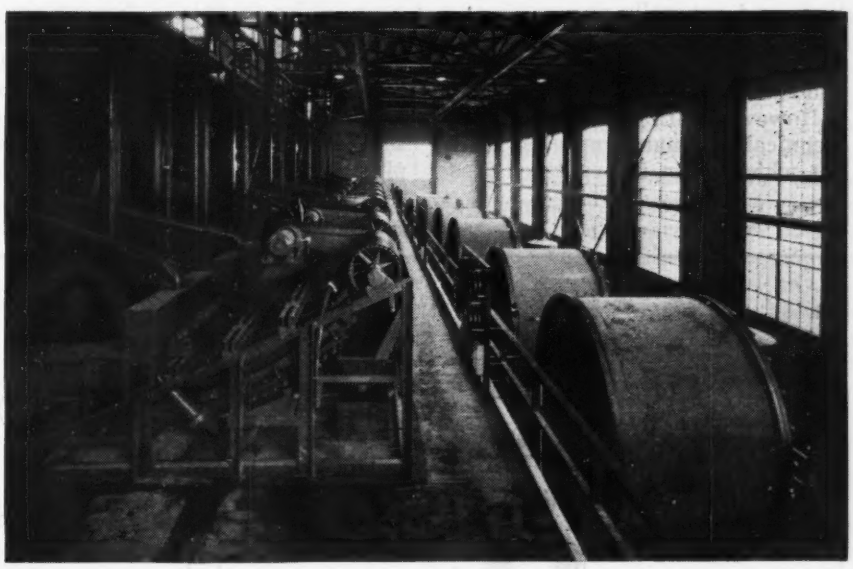
Spray pipes *B* are fastened to the pans forcing pressure water up through openings in the pan at the center of the magnetic poles. As the feed is carried from one pole to the next, the neutral point naturally is at the center of these poles. At these points the spray water can thoroughly wash out any entrapped rock particles. At the same time the pans will keep any magnetite particles knocked off by this washing within the magnetic field, thereby reducing the loss of iron in the tailings.

The magnets are never submerged in the water.

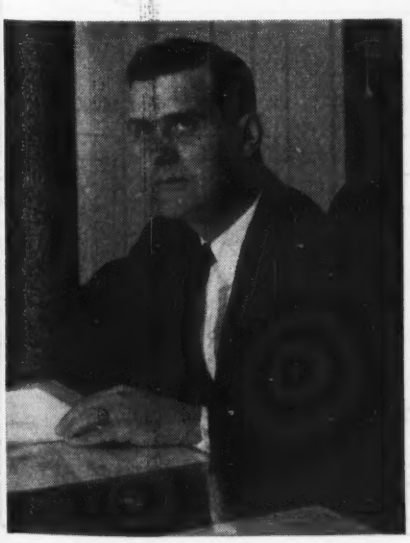
The separators at the Fisher Hill plant have a magnet 4 ft. wide and approximately 8 ft. long. They are driven by 5-hp. motors connected to the head pulley with a chain drive. Belt speed is 225 fpm. Rougher feed is minus 5/16 in. and the finished feed –10 mesh with approximately 15 percent –100 mesh.



AN 8x12-FT. ROD MILL on each unit grinds the plus-10-mesh oversize from the first screening. These mills discharge each to its two 4x10-ft. vibrating screens at the right. Note the rods stored above the latter.



LINNEY FINISHING SEPARATORS, four of them to a unit with room for a fifth, stand on the lowest operating floor of the mill. They deliver to the Dorrco filters, two on each unit, at the right.



R. J. Linney, District Manager, Port Henry District, Republic Steel Corporation.

Capacity is dependent on the iron content of the feed. The more iron, the greater the amount of material that must be carried the full length of the machine. For example, on iron ore containing 35 percent iron, 100 tons per hour can be handled.

This separator can make either a 3-part or a 2-part separation as desired. In the former case a tailing, a middling, and a concentrate will be produced. In a 2-part separation, tailings are taken off at both the tailings hopper and the middling hopper and a concentrate is carried to the discharge end. The desired control of these products is obtained by varying the magnet current and by increasing or decreasing the pressure on the water sprays. It has been found that with the design plus these variables, a much sharper separation can be obtained.

The concentrate produced at the Fisher Hill plant averages 69.5 percent Fe. Tailings will run 2 percent and under in magnetic iron. Recovery is 95 per cent and the ratio of concentration is 1.75.

Research Department Can Promote Mine Efficiency

T. M. WATERLAND, Efficiency and Research Engineer, Britannia Mining & Smelting Co., Ltd., Britannia Beach, B. C.

MANY MINES do not recognize that job standardization with close engineering control can be applied effectively to mining, and that greater efficiency and output per worker can be achieved by adopting improved engineering practices as soon as they become known.

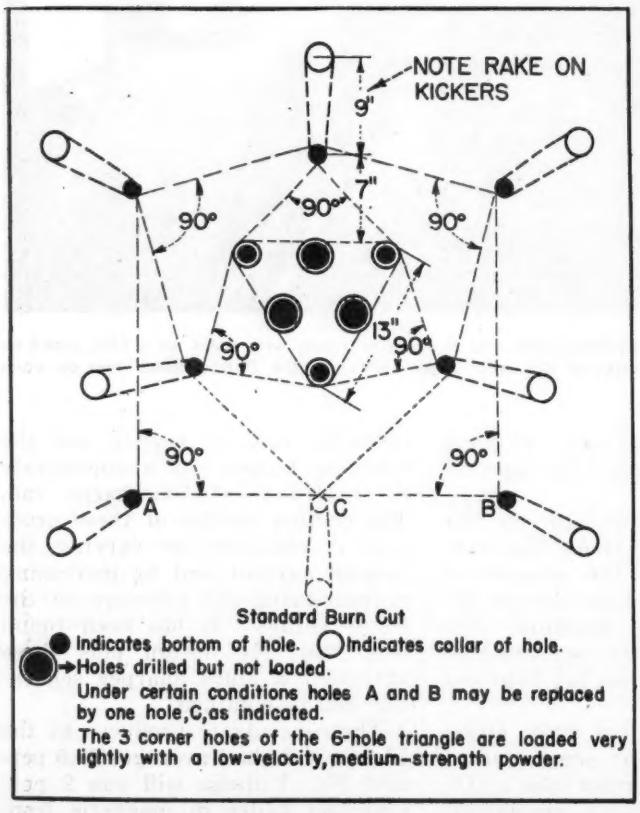
A review of operating history reveals that the old-school miner had to handle a multiplicity of jobs and was necessarily the boss of his own domain. Foremen and shift bosses, who were trained under such conditions and generally chosen because of their skill in doing various jobs, were not too receptive to new ideas and methods.

However, with the advent of the technical foreman, improved methods which often incorporated ideas from other mines were more generally adopted, and labor-saving devices and mechanization gained favor. These changes in turn required job specialization, more scientific production methods, increased supervision, and close engineering control.

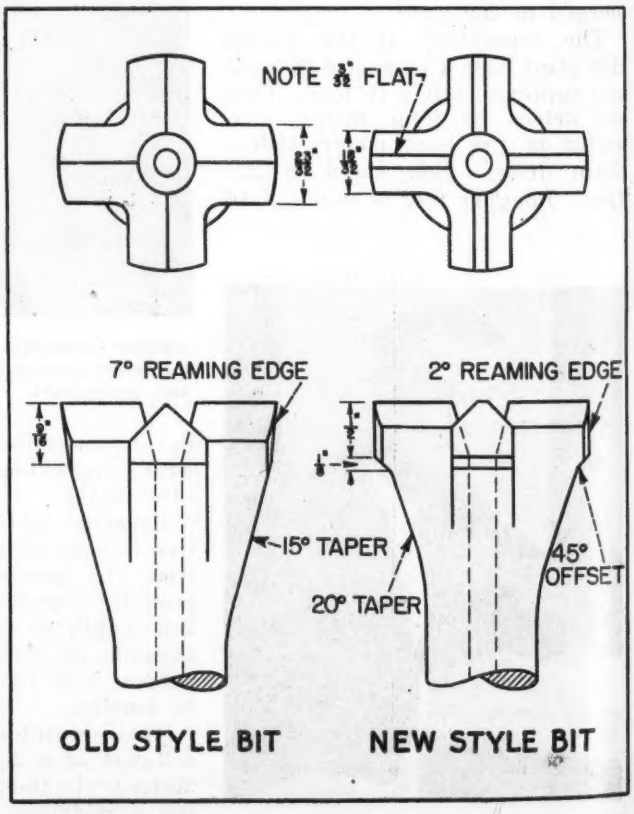
Today the staff of a typical progressive mining organization includes a mine engineer, geologist, ventilation engineer, and surveyor. However, comparatively few mines have a research and efficiency engineer. Why is this? Are mining problems so basically different from problems of other industries that principles of engineering research cannot be applied? To demonstrate that modern research can be applied to mining, the writer, who has been in charge of the efficiency and research department of the Britannia Mining & Smelting Co., Ltd., for the past five years, presents some of the problems which were investigated and solved.

New Bit Speeds Drilling

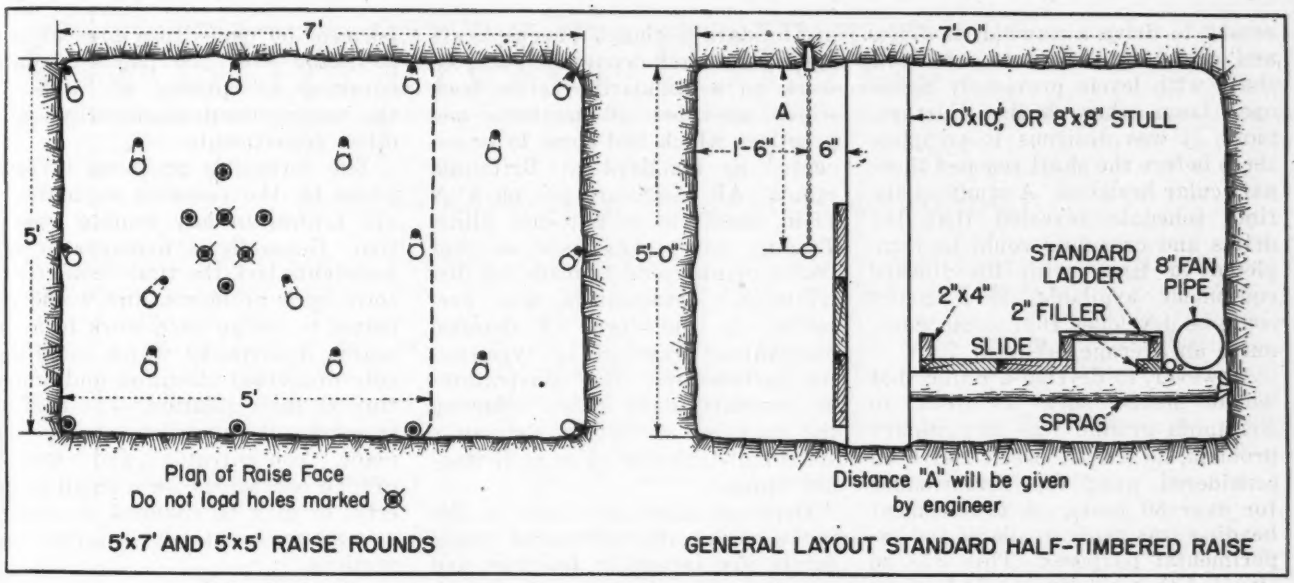
That a problem for the research man should arise in the steel-sharpening shop was quite unexpected because the work of this department had been considered beyond reproach for years. The shop was well managed, costs were low, and the quality of conventional drill steel turned out had a province-wide reputation. Comparative tests were made with different detachable bits and always showed the


NOTE RAKE ON KICKERS
9"
7"
13"
90°
A
B
C
Standard Burn Cut
Indicates bottom of hole.
Indicates collar of hole.
Holes drilled but not loaded.
Under certain conditions holes A and B may be replaced by one hole, C, as indicated.
The 3 corner holes of the 6-hole triangle are loaded very lightly with a low-velocity, medium-strength powder.

This round, which broke from 8 to 9.75 ft. in headings, was developed through experiments of the research department.



An investigation of various detachable bits produced this new design, which penetrates rock faster than older types of bits.



Raise details illustrated in pages of a standard-practice book compiled by the research department and distributed to the operating staff to promote uniform and efficient workmanship.

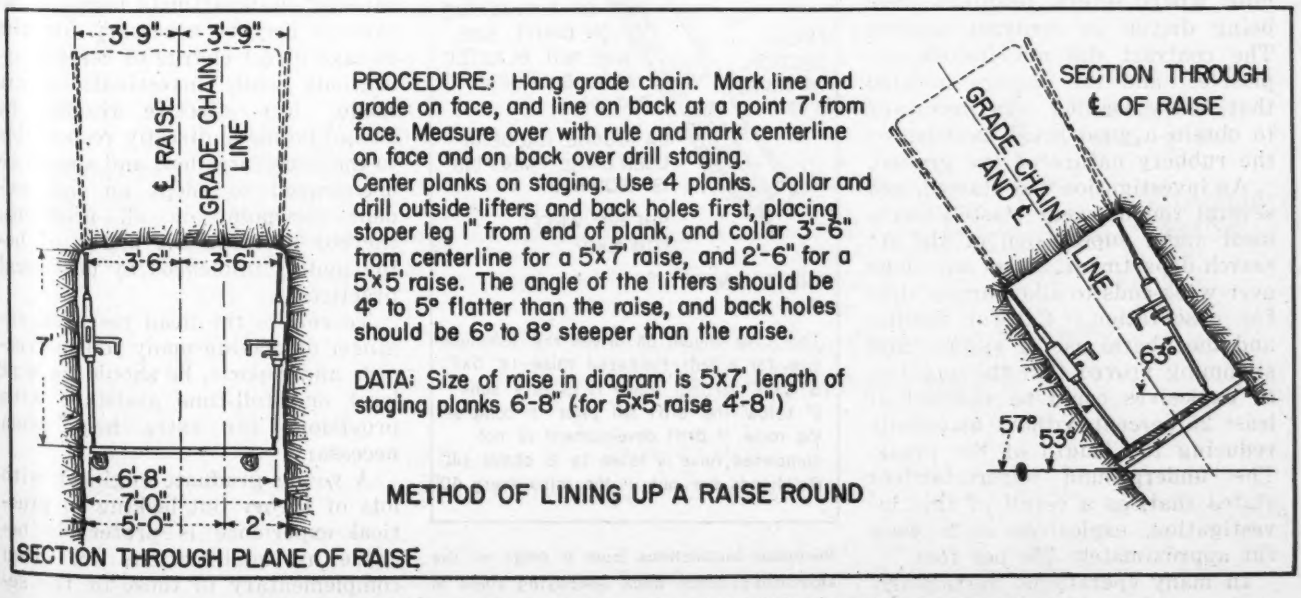
same results—a 10 to 15 percent advantage in drilling speed for the locally sharpened conventional steel. In 1942, however, a new detachable bit was introduced which came out of a drill test with a 10 to 15 percent advantage in drilling speed over the Britannia steel, and a greater advantage in penetration.

An investigation was started to determine why these bits were better than conventional steel. The fact that the detachable bits were manufactured from the same grade of steel as the conventional steel indicated that the increased drilling speed was due to bit design. After numerous experiments and much test drilling, a new bit was finally evolved which, although somewhat revolutionary in appearance, had drilling and penetration qualities that were even better than the new detachable bits that started the investigation. See illustration of new bit design.

Rock-Drill Replacement

In the machine doctor's department, rock drills had been purchased solely on the basis of their performance as new machines. Once the desired model had been selected, a sufficient number was purchased to do the work. These machines were then kept in working condition by continuously replacing worn-out parts with new parts. As a result of this policy, no new machines were purchased for years. In many of the machines none of the original parts remained; all had been gradually replaced by new parts. A careful analysis of this problem based on accurate cost records revealed that several thousand dollars could be saved per year if each machine would be dismantled and replaced as soon as the original cylinder was worn out. Such a policy would enable the company to avail itself more readily of any improved machines that might come on the market. This subject was discussed in *E.&M.J.*, September, 1943.

Several years ago a new shaft was being raised from the 4,100 level to the 2,200 level. It was nec-


3'-9"
3'-9"
℄ RAISE
GRADE CHAIN LINE
3'-6"
3'-6"
7'
6'-8"
7'-0"
5'-0"
2'
SECTION THROUGH PLANE OF RAISE
PROCEDURE: Hang grade chain. Mark line and grade on face, and line on back at a point 7' from face. Measure over with rule and mark centerline on face and on back over drill staging.
Center planks on staging. Use 4 planks. Collar and drill outside lifters and back holes first, placing stoper leg 1" from end of plank, and collar 3'-6" from centerline for a 5'x7' raise, and 2'-6" for a 5'x5' raise. The angle of the lifters should be 4° to 5° flatter than the raise, and back holes should be 6° to 8° steeper than the raise.
DATA: Size of raise in diagram is 5'x7', length of staging planks 6'-8" (for 5'x5' raise 4'-8")
METHOD OF LINING UP A RAISE ROUND
SECTION THROUGH ℄ OF RAISE
GRADE CHAIN AND ℄ LINE
63°
57°
53°

Page of standard-practice book. Note specific and detailed instructions to raise miners.

essary to drive a number of drifts and crosscuts to connect the new shaft with levels previously developed from other shafts. Furthermore, it was desirous to complete these before the shaft reached those particular horizons. A study of the time schedule revealed that the drifts and crosscuts could be completed in time, with the limited equipment available, if a round could be developed that would guarantee an average break of 7 ft.

However, to develop a round that would insure such a break in Britannia ground was no ordinary problem, as a 5-ft. break had been considered near top performance for over 30 years. A development heading was made available for experimental purposes. This was so situated that blasting could be done at any time during the shift without fouling the mine air. Several different types of cuts were tried. Holes were blasted separately or in combinations and with different strengths and types of explosives. A distinctly new type of cut was developed which proved effective in Britannia ground. Rounds incorporating it broke over 8 ft. in several headings for a long distance. In one heading an average break of 9.75 ft. was maintained for over 500 ft. See illustration of standard round. Rounds incorporating this cut or slight variations of it have proved successful in other mines.

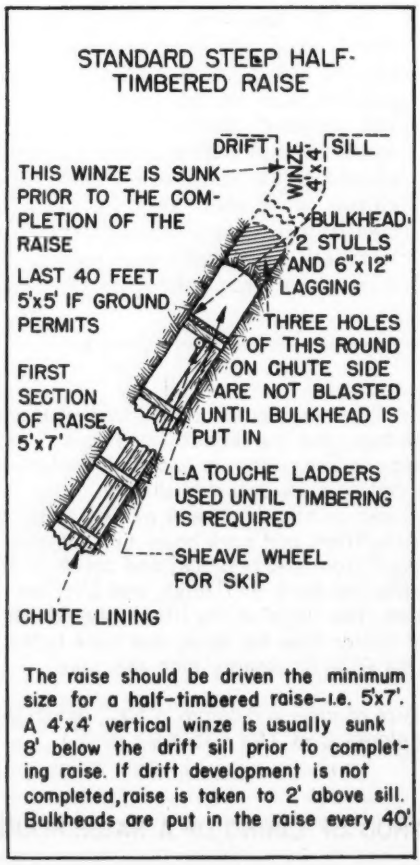
Explosive Costs Reduced

Records kept on development headings revealed that explosive costs per foot of advance were unusually high in one section of the mine where several headings were being driven by contract miners. The contract did not include explosives, and the miners insisted that heavy loading was necessary to obtain a good break because of the rubbery nature of the ground.

An investigation was started, and several rounds were blasted piecemeal under supervision of the research department. Work was done over week-ends to allow ample time for observation. Careful loading and the liberal use of spacers and stemming proved that the quantity of explosives could be reduced at least 25 percent without materially reducing the length of the break. The underground superintendent stated that, as a result of this investigation, explosives costs were cut approximately 75c per foot.

In many operations, particularly timbering, it is advantageous to set up standard methods. Several years ago the research department started work on a standard-practice book which recorded all methods and practices which had come to be accepted as standard at Britannia mines. All data were put on 8½x 11-in. sheets to permit easy filing. Tracing paper was used so that Ozalid prints could be made for distribution. Information was presented in the form of detailed mechanical drawings or typewritten instructions. See illustrations of standard data sheets showing the approved method of driving a steep half-timbered raise at Britannia mines.

Original sheets are kept on file in the engineering office, and Ozalid prints are issued to foreman and department heads in loose-leaf folders. Although included data describe the best standards in use at the time, foremen are instructed that the methods are not to be considered ultimate. Whenever a new method, or a better one, is developed, new or revised pages are issued as replacements. The standard-practice book was well received by foreman and department heads and has been enlarged from a first issue of 50 pages to a present one including over 200 pages of data covering all phases of work of the underground, engineering, and other departments.


STANDARD STEEP HALF-TIMBERED RAISE
DRIFT
WINZE 4'x4'
SILL
THIS WINZE IS SUNK PRIOR TO THE COMPLETION OF THE RAISE
BULKHEAD 2 STULLS AND 6"x12" LAGGING
LAST 40 FEET 5'x5' IF GROUND PERMITS
THREE HOLES OF THIS ROUND ON CHUTE SIDE ARE NOT BLASTED UNTIL BULKHEAD IS PUT IN
FIRST SECTION OF RAISE 5'x7'
LA TOUCHE LADDERS USED UNTIL TIMBERING IS REQUIRED
SHEAVE WHEEL FOR SKIP
CHUTE LINING
The raise should be driven the minimum size for a half-timbered raise—i.e. 5'x7'. A 4'x4' vertical winze is usually sunk 8' below the drift sill prior to completing raise. If drift development is not completed, raise is taken to 2' above sill. Bulkheads are put in the raise every 40'.

Pertinent instructions from a page of the standard-practice book specifying steps to be observed in driving raises.

The foregoing problems investigated by the research department are typical in any mining operation. Generally, a manager or his assistants lack the time required to solve such problems, and would do better to assign such work to a research department which could devote undivided attention and ample time to their solution. The field of research may include shops, power plant, concentrator and underground operations for a small property, or may be confined to underground work entirely in larger operations.

Graphs Aid Investigation

Along with investigations carried on by the department, records of production, development, and cost data, particularly those relating to supplies, must be kept. Recording these data in graph form often reveals pertinent facts that might otherwise be overlooked.

It is inadvisable to assign efficiency work to an inexperienced junior engineer, because he will rarely gain the confidence of the underground workers and staff. A seasoned engineer, preferably one who has had outside experience, will be more likely to succeed, because his outlook will probably be more free from the influence of local precedents.

Generally the engineer in charge of an efficiency and research department should act in an advisory capacity to department heads. However, it may be necessary for him to take direct charge of certain operations while investigations are made. For effective results, he should be made directly responsible to the superintendent and should be encouraged to adopt an independent viewpoint on all problems, thereby avoiding the pitfall of being unduly influenced by past local practices.

To relieve the head research engineer of making many routine records and reports, he should have at least one full-time assistant with provisions for extra help when necessary.

A young graduate engineer with lots of theory but lacking in practical experience is preferable because his qualifications are often complementary to those of the senior engineer.

OPERATING IDEAS

Double Keyway in Gears Aids Repairmen

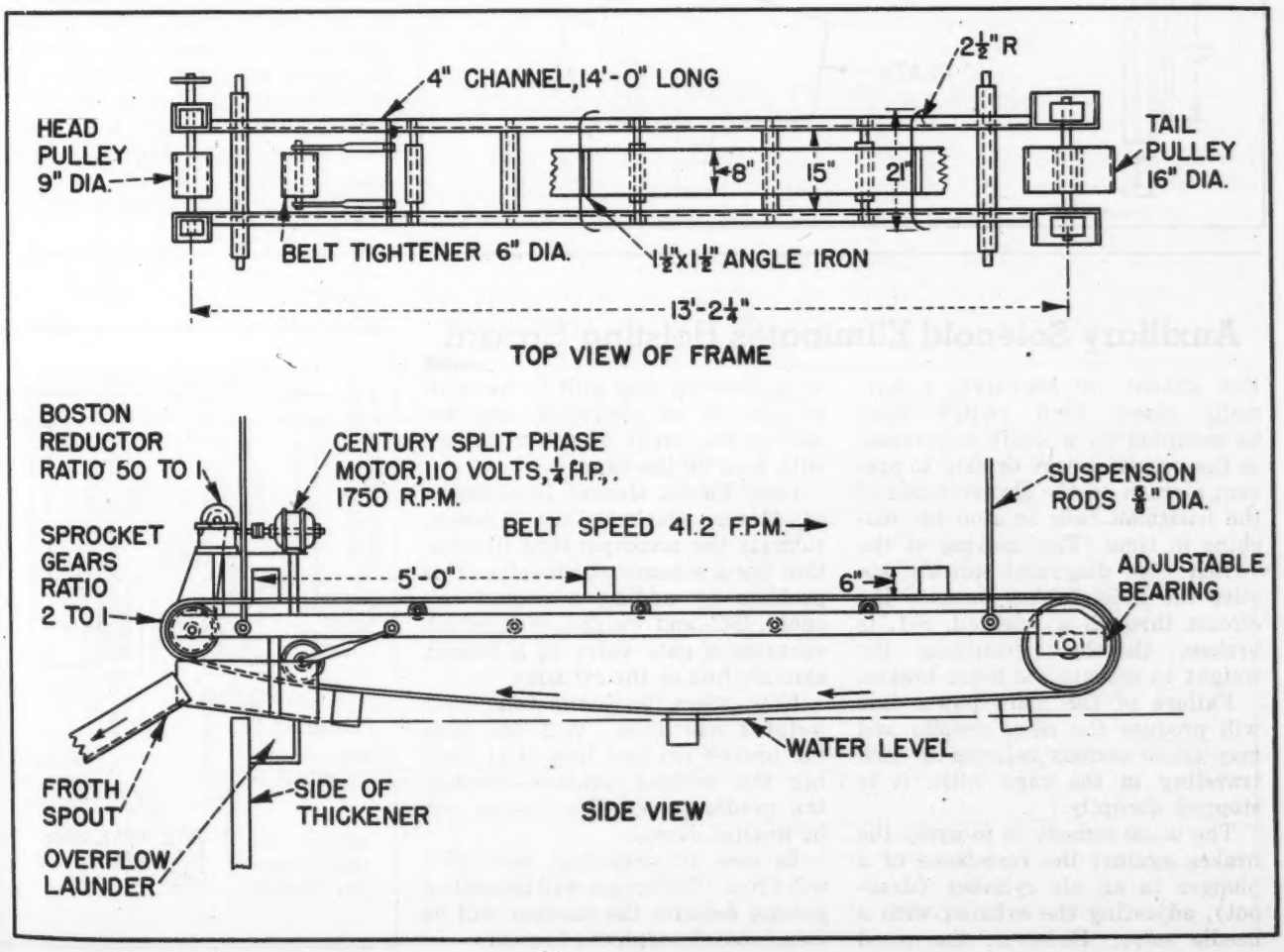
MAINTENANCE MEN sometimes find that in replacing spur gears with tapered keyways, the spare gears cannot be applied because the keyways are cut in the wrong direction. To avoid this nuisance, Walter Hill, of New Town, Tasmania, Australia, reports that the Electrolytic Zinc Co., Risdon, Tasmania, has arranged to have two keyways cut (in opposite directions) in all spur gears, wheels, and pinions. Thus, no matter where a gear is to be installed, it will always fit. This is especially advantageous in event of a breakdown when available spare gears must be installed.

Cutting two keyways presents an added advantage in installations of gears in open positions, where the key can be driven in from either side. In such cases, after teeth have been partly worn, the wheel and pinion may be reverse faced so that new meshing faces are provided. This reversal improves running performance of the gear set.

Scraper Removes Froth From Concentrate Thickener

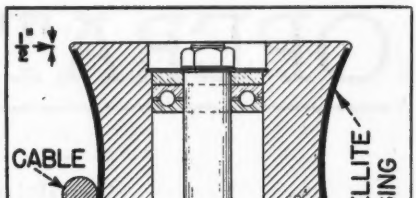
AS FROTHS which develop on the surface of concentrate thickeners contain appreciable amounts of concentrate, it is advantageous to remove such froths and add them to the thickened pulp. A conveyor belt to which curved paddles are attached has been installed to do this work at the mill of the Bunker Hill & Sullivan Mining & Concentrating Co., Kellogg, Idaho.

Two sprays directed across the surface of the thickener impart a general rotating motion to the froth, causing it to move into the path of the paddles, which scrape it into a spout. The froth is carried from the thickener and joins thickened concentrates in an elevator which carries both products to the filters.

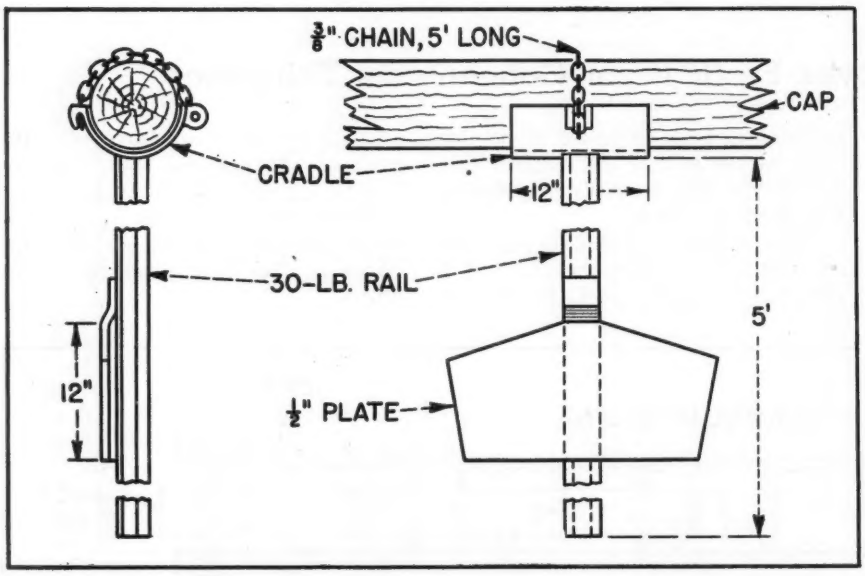


Hard-Facing Prolongs Roller Life

MINING EQUIPMENT must be able to withstand hard usage and resist abrasive wear. A hard steel is not always sufficiently ductile, and a tough steel is not hard enough to resist abrasion. In many cases the answer to the problem will be found in the application of hard-facing material. Phil Keast, shop foreman, Empire-Star Mines Co., Ltd., Grass Valley, Calif., solved the problem of prolonging the life of rollers used in the inclined Empire shaft to guide the hoisting cable by hard-facing the roller faces with Stellite, as shown in the accompanying sketch. The rollers used are of the cast-steel type. Untreated they last from three to six weeks, in contrast to those hard-faced which give satisfactory service for more than four years.



Timber Installer Attached to Mucking Machine



TO ELIMINATE unnecessary time and labor involved in setting up heavy, green maple drift timber, this installer was designed by Bertil Djupe, underground mechanical foreman at Pickands, Mather & Co.'s James mine, at Iron River, Mich. The installer was made to fit the dipper of a No. 21 Eimco loader and weighs about 75 lb.

In operation, each post is wrapped above center with the ⅜-in. chain that is attached to the cradle and raised into position. Then a cap is chained to the cradle and raised to the top of the posts. To mount this installer on the dipper, or to remove it, requires but a few minutes, according to Burton J. Westman, mining geologist, of Stambaugh, Mich., who submits the idea.

Auxiliary Solenoid Eliminates Hoisting Hazard

FOR REASON OF SECURITY, a normally closed limit switch must be mounted on a shaft headframe in the way of a cage or skip to prevent a crash on the sheave wheel if the hoistman fails to stop his machine in time. The opening of the switch (see diagram) quickly applies the hoist brakes because the circuit through a solenoid, S-1, is broken, thereby permitting the weight to actuate the hoist brakes.

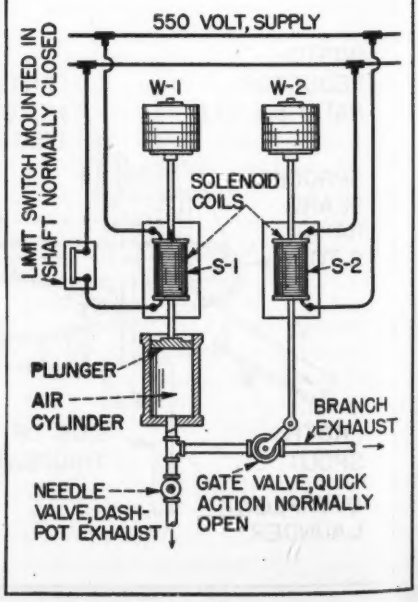
Failure of the main power line will produce the same results and may cause serious injuries to men traveling in the cage when it is stopped abruptly.

The usual remedy is to apply the brakes against the resistance of a plunger in an air cylinder (dashpot), adjusting the exhaust with a needle valve. However, the speed of application may still be too slow in case of an overwind, and too fast in the event of power failure with men on the cage.

Leon Valois, Quebec Department of Mines, Quebec City, Canada, submits the accompanying illustration for a scheme which solves this problem by adding a second solenoid, S-2, and weight, W-2, which operates a gate valve in a branch exhaust line of the cylinder.

Now, when the power fails, both weights will drop. W-2 will close the branch exhaust line, thus forcing the dashpot exhaust through the needle valve. The brakes will be applied slowly.

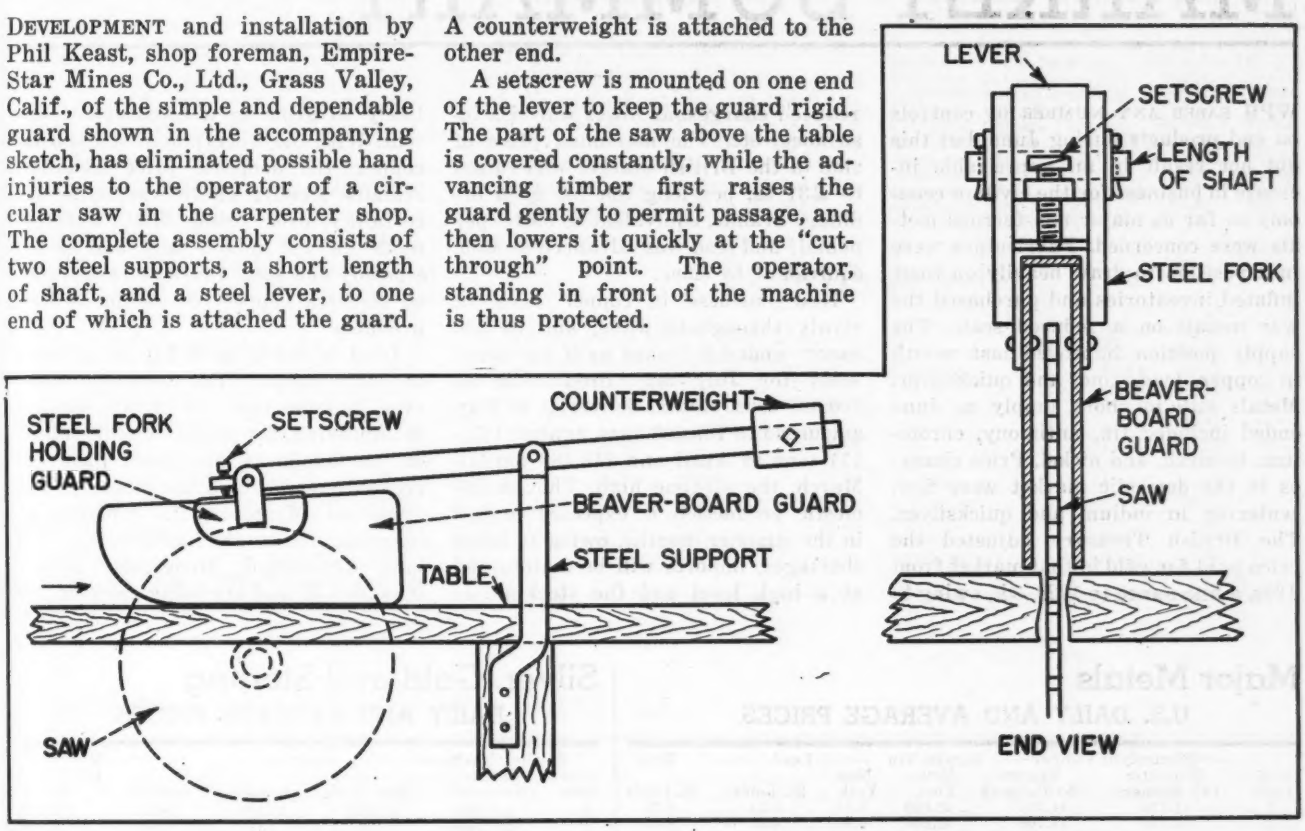
In case of overwind, only W-1 will drop. The brakes will be applied quickly because the dashpot will be exhausted through the branch.



Saw Guard Prevents Hand Injury

DEVELOPMENT and installation by Phil Keast, shop foreman, Empire-Star Mines Co., Ltd., Grass Valley, Calif., of the simple and dependable guard shown in the accompanying sketch, has eliminated possible hand injuries to the operator of a circular saw in the carpenter shop. The complete assembly consists of two steel supports, a short length of shaft, and a steel lever, to one end of which is attached the guard. A counterweight is attached to the other end.

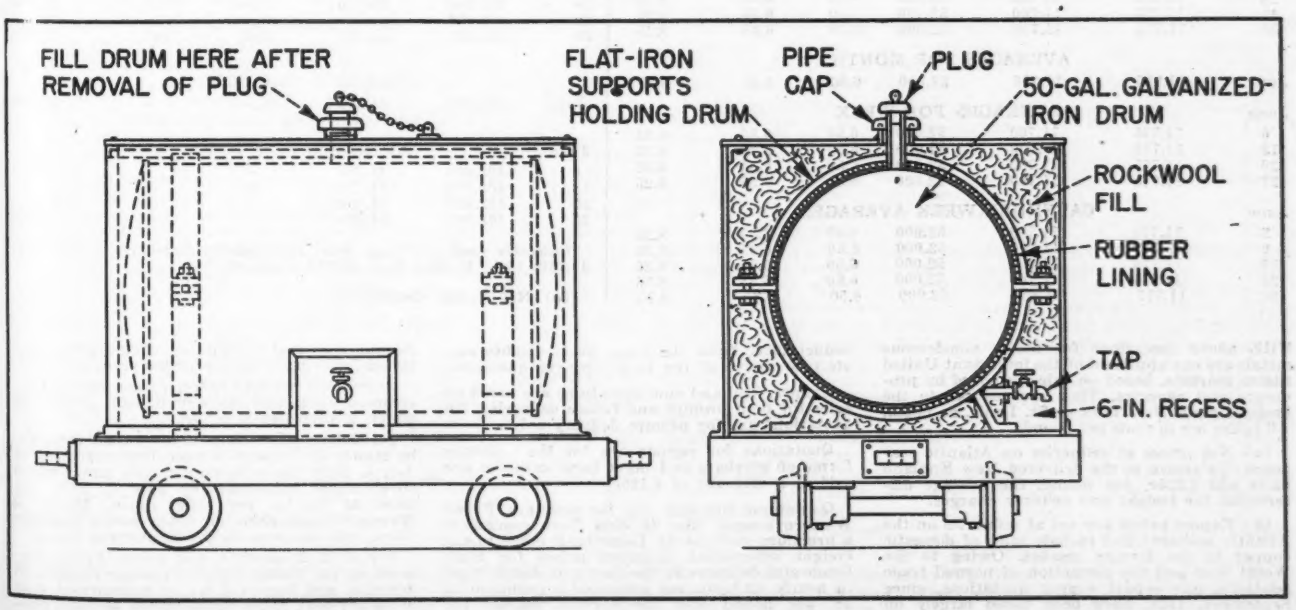
A setscrew is mounted on one end of the lever to keep the guard rigid. The part of the saw above the table is covered constantly, while the advancing timber first raises the guard gently to permit passage, and then lowers it quickly at the "cut-through" point. The operator, standing in front of the machine is thus protected.



Insulated Tank Car Supplies Fresh Drinking Water

FRESH, COOL DRINKING water is carried underground at the Morning mine of the Federal Mining & Smelting Co., near Mullan, Idaho, in this tank car carrying a 50-gal. galvanized-iron drum fitted with filling and drain connections. The drum rests in a box-like sheet-iron container which is bolted to the flat top of a four-wheel truck with two flatiron clamps.

Ice water obtained from a surface filling station is kept cool by rockwool insulation which fills the voids between the drum and the housing. The tap connection with standard faucet is installed in a recess to protect it from possible damage. Water is poured into the tank through a short nipple, which is sealed by a common plug.



MARKET SUMMARY

WPB EASED ANY NUMBER OF controls on end products during June, but this did not result in an appreciable increase in business for the civilian economy so far as major non-ferrous metals were concerned. Fabricators were in a position to draw heavily on their inflated inventories and purchased the war metals on a reduced scale. The supply position improved last month in copper, lead, zinc, and quicksilver. Metals still in short supply as June ended included tin, antimony, chromium, bismuth, and nickel. Price changes in the domestic market were few, centering in indium and quicksilver. The British Treasury adjusted the price paid for gold in that market from 168s. a fine ounce to 172s. 3d., owing to reduced charges, as lower war risk insurance, etc. The maximum price of zinc in the British market was raised to £31 5s. per long ton for good ordinary brands, equivalent to 5.61c. per pound; and lead was advanced to £30, equivalent to 5.38c.

New business in copper came in slowly throughout June, and as the month ended it looked as if the deliveries for July may drop close to 100,000 tons. Actual deliveries in May amounted to 139,203 tons, against 161,111 tons in April and 218,488 tons in March, the all-time high. Though domestic production is expected to fall in the summer months, owing to labor shortages, imports will be maintained at a high level and the stockpile is likely to grow to a considerable extent. With the Government stockpiling copper, the domestic price situation remains steady. There was some uncertainty over using MRC dutiable metal in the mixed war and peace economy and some fabricators demanded domestic copper for use in civilian products.

Lead is listed by WPB as a metal in short supply. The industry, however, believes that the supply outlook is improving, for stocks of refined lead in the hands of producers have increased steadily and the stockpile has expanded. Moreover, the demands of consumers under the limitations on use have diminished. Moderately larger tonnages of lead are being released for

Major Metals

U.S. DAILY AND AVERAGE PRICES

1945	Electrolytic Copper		Straits Tin	Lead		Zinc
	Domestic	Export	New	New		
June	(a) Refinery	(b) Refinery	York	York	St. Louis	St. Louis
1	11.775	11.700	52.000	6.50	6.35	8.25
2	11.775	11.700	52.000	6.50	6.35	8.25
4	11.775	11.700	52.000	6.50	6.35	8.25
5	11.775	11.700	52.000	6.50	6.35	8.25
6	11.775	11.700	52.000	6.50	6.35	8.25
7	11.775	11.700	52.000	6.50	6.35	8.25
8	11.775	11.700	52.000	6.50	6.35	8.25
9	11.775	11.700	52.000	6.50	6.35	8.25
11	11.775	11.700	52.000	6.50	6.35	8.25
12	11.775	11.700	52.000	6.50	6.35	8.25
13	11.775	11.700	52.000	6.50	6.35	8.25
14	11.775	11.700	52.000	6.50	6.35	8.25
15	11.775	11.700	52.000	6.50	6.35	8.25
16	11.775	11.700	52.000	6.50	6.35	8.25
18	11.775	11.700	52.000	6.50	6.35	8.25
19	11.775	11.700	52.000	6.50	6.35	8.25
20	11.775	11.700	52.000	6.50	6.35	8.25
21	11.775	11.700	52.000	6.50	6.35	8.25
22	11.775	11.700	52.000	6.50	6.35	8.25
23	11.775	11.700	52.000	6.50	6.35	8.25
25	11.775	11.700	52.000	6.50	6.35	8.25
26	11.775	11.700	52.000	6.50	6.35	8.25
27	11.775	11.700	52.000	6.50	6.35	8.25
28	11.775	11.700	52.000	6.50	6.35	8.25
29	11.775	11.700	52.000	6.50	6.35	8.25
30	11.775	11.700	52.000	6.50	6.35	8.25
			AVERAGES FOR MONTH			
June	11.775	11.700	52.000	6.50	6.35	8.25
			AVERAGES FOR WEEK			
June						
6	11.775	11.700	52.000	6.50	6.35	8.25
13	11.775	11.700	52.000	6.50	6.35	8.25
20	11.775	11.700	52.000	6.50	6.35	8.25
27	11.775	11.700	52.000	6.50	6.35	8.25
			CALENDAR WEEK AVERAGES			
June						
2	11.775	11.700	52.000	6.50	6.35	8.25
9	11.775	11.700	52.000	6.50	6.35	8.25
16	11.775	11.700	52.000	6.50	6.35	8.25
23	11.775	11.700	52.000	6.50	6.35	8.25
30	11.775	11.700	52.000	6.50	6.35	8.25

Silver, Gold and Sterling

DAILY AND AVERAGE PRICES

1945	Sterling Exchange	Silver		Gold	
	"Checks"	(c)			(d) United
June	(Nominal)	New York	London	London	States
1	402.000	44.750	25.500	168s.	$35.000
2	402.000	(e)	(e)	(e)	35.000
4	402.000	44.750	25.500	168s.	35.000
5	402.000	44.750	25.500	168s.	35.000
6	402.000	44.750	25.500	168s.	35.000
7	402.000	44.750	25.500	168s.	35.000
8	402.000	44.750	25.500	168s.	35.000
9	402.000	(e)	(e)	(e)	35.000
11	402.000	44.750	25.500	172s. 3d.	35.000
12	402.000	44.750	25.500	172s. 3d.	35.000
13	402.000	44.750	25.500	172s. 3d.	35.000
14	402.000	44.750	25.500	172s. 3d.	35.000
15	402.000	44.750	25.500	172s. 3d.	35.000
16	402.000	(e)	(e)	(e)	35.000
18	402.000	44.750	25.500	172s. 3d.	35.000
19	402.000	44.750	25.500	172s. 3d.	35.000
20	402.000	44.750	25.500	172s. 3d.	35.000
21	402.000	44.750	25.500	172s. 3d.	35.000
22	402.000	44.750	25.500	172s. 3d.	35.000
23	402.000	(e)	(e)	(e)	35.000
25	402.000	44.750	25.500	172s. 3d.	35.000
26	402.000	44.750	25.500	172s. 3d.	35.000
27	402.000	44.750	25.500	172s. 3d.	35.000
28	402.000	44.750	25.500	172s. 3d.	35.000
29	402.000	44.750	25.500	172s. 3d.	35.000
30	402.000	44.750	(e)	(e)	35.000
		AVERAGES FOR MONTH			
June	402.000	44.750	25.500	—	35.000
		AVERAGES FOR WEEK			
June					
6	402.000	44.750	—	—	
13	402.000	44.750	—	—	
20	402.000	44.750	—	—	
27	402.000	44.750	—	—	

Calendar week averages, New York Silver: June 2nd, 44.750; 9th, 44.750; 16th, 44.750; 23rd, 44.750; 30th, 44.750.

(e) Not quoted (Saturday).

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis, as noted. All prices are in cents per pound.

(a) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.225c. per pound, the average differential for freight and delivery charges.

(b) Export prices are net at refineries on the Atlantic seaboard and include sales of domestic copper in the foreign market. Owing to the World War and the disruption of normal trade relations, our export copper quotations, since September, 1939, have been based largely on f.a.s. transactions, ex United States ports. We deduct .05c. from the f.a.s. basis (lighterage, etc.) to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingot bars; cathodes are sold at a discount of 0.125c.

Quotations for zinc are for ordinary Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered in the East and Middle West in nearly all instances command a premium of 1c. per pound over the current market for Prime Western but not less than 1c. over the *Engineering and Mining Journal's* average quotation for Prime Western for the previous month.

Quotations for lead reflect prices obtained for common lead, and do not include grades on which a premium is asked.

(c) Silver other than newly-mined domestic, by Handy & Harman. Under Treasury order of July 6, 1939, the price on domestic newly-mined silver mined subsequent to July 1, 1939, was fixed at 71.11c. per troy ounce. Handy & Harman's quotations on newly-mined domestic silver, 999 fine was 70⅝c. throughout June.

(d) U. S. Treasury's gold price. Actual payment by the United States Treasury for gold in domestic and imported ore or concentrate is at 99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

collapsible tubes and storage batteries.

Order M-11-b, restricting use of zinc, has been revoked. This permits manufacturers to use the metal freely if they can get it. Order M-11, covering allocation, has been amended. The revised order provides that a producer must hold metal required for essential uses until the 10th of each month, after which surplus material may be released on unrated orders.

Quicksilver consumption in April amounted to 7,500 flasks, the highest monthly rate on record. Market authorities claim that consumption increased in May and June, yet prices declined $7 per flask in the last month. Heavy imports and uncertainty over the duration of the Japanese war brought on weakness in prices.

Indium was lowered to $3 an ounce troy, production being well in excess of consumption.

Russia is shipping manganese ore to the United States for the account of MRC.

Miscellaneous Metals Monthly Averages

Average prices of miscellaneous metals for May and June:

(a) New York, packed in cases, in lots of 5 tons or more but less than a carload. (b) Nominal. (c) Producer's price for commercial sticks. (d) Average producers' and platers' quotations, (e) Special shapes sold to platers.

	May	June
Quicksilver, N. Y. flask	153.692	147.731
Antimony (a)	15.839	15.839
Antimony, bulk, Laredo	14.500	14.500
Antimony, bulk, N. Y.	15.265	15.265
Antimony, Chinese (b)	16.500	16.500
Platinum, oz. troy	35.000	35.000
Cadmium (c)	90.000	90.000
Cadmium (d)	92.500	92.500
Cadmium (e)	95.000	95.000
Aluminum ingot	15.000	15.000

E & M J Price Index

Weighted index of non-ferrous metal prices (copper, lead, zinc, tin, silver, nickel, and aluminum). The average for the years 1922-1923-1924 equals 100.

1929	110.33	1937	90.86
1930	82.87	1938	73.67
1931	60.20	1939	77.71
1932	48.26	1940	79.22
1933	59.79	1941	83.49
1934	69.59	1942	86.80
1935	74.66	1943	88.74
1936	73.45	1944	88.74

	1943	1944	1945
January	88.74	88.74	88.74
February	88.74	88.74	88.74
March	88.74	88.74	88.74
April	88.74	88.74	88.74
May	88.74	88.74	88.74
June	88.74	88.74	88.74
July	88.74	88.74	....
August	88.74	88.74	....
September	88.74	88.74	....
October	88.74	88.74	....
November	88.74	88.74	....
December	88.74	88.74	....

Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipment, f.o.b. New York, unless otherwise stated
(July 2, 1945)

MISCELLANEOUS METALS

Aluminum, ingot, 99 plus per cent, lb.	15c.
Antimony, domestic, spot, lb., 5 tons or more	15.839c.
Bismuth, ton lots, lb.	$1.25
Cadmium, commercial sticks, lb.	90c.
Calcium, lb., ton lots, 97 @ 98 percent, cast	$1.85
Chromium, 97 per cent grade, lb.	89c.
Cobalt, 97 to 99 per cent, per lb.	$1.50
Indium, troy oz.	$3.00
Nickel, electrolytic cathodes, lb.	35c.
Magnesium, 99.8 per cent, carloads, lb.	20½c.
Palladium, troy oz.	$24.00
Platinum (Official quotation) troy oz.	$35.00
Quicksilver, flask of 76 lb., 100 flasks or more	$145.00
Selenium, 99.5 per cent, lb.	$1.75
Silicon, minimum 97 per cent, spot, carloads, lb.	14.75c.
Tellurium, lb.	$1.75 nom.
Thallium, 100 lb. or more, lb.	$12.50 nom.
Titanium, 96 to 98 per cent, lb.	$5.00

METALLIC ORES

Beryllium Ore, 8 to 12% BeO, f.o.b. mine, per unit	$10.00
Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry 48% Cr_2O_3, 2.8 to 1 ratio	$41.00
48% Cr_2O_3 3 to 1 ratio	$43.50
Iron Ore, Lake Superior, Lower Lake ports, long ton:	
Old Range bessemer	$4.75
Mesabi bessemer	$4.60
Old Range non-bessemer	$4.60
Mesabi, non-bessemer	$4.45
Lead (Galena) 80 per cent, Joplin, Mo., ton	$76.01
Manganese, Metals Reserve Co. sales price, per long-ton unit of Mn contained, 48 per cent, subject to premiums and penalties, effective May 15, 1944: 85c. (duty paid) New York, Philadelphia, Baltimore, Norfolk, Mobile, and New Orleans; 91c., Fontana, Calif., Provo, Utah, and Pueblo, Colo.	
Molybdenum Ore, 90%, per lb. of MoS_2 f.o.b. mines	45c.
Tungsten Ore, per unit of WO_3:	
Chinese, 60 per cent, duty paid	$24.00
Domestic, 60 per cent and upward	$24.00@$24.50
Vanadium Ore, per lb. of contained V_2O_5 f. o. b. mines	27½c.
Zinc Ore, Prime, 60 per cent concentrate, Joplin, Mo.; per ton	$55.28
(a) Prices at mines, small lots, normally several dollars less.	

METALLIC COMPOUNDS

Arsenic Oxide (arsenic) lb.	4c.
Cobalt Oxide, 70 @ 71 per cent, lb.	$1.84
Copper Sulphate, 100 lb.	$5.00

ALLOYS

Beryllium Copper, 2.5 to 3 per cent Be, per lb. of contained Be	$15.00
Ferrochrome, 65 @ 70 per cent per lb. of Cr contained	13c.
Ferromanganese, 78 @ 82 per cent, gross ton	$135.00
Ferromolybdenum, 55 @ 65 per cent Mo, lb. of Mo contained	95c.
Ferrosilicon, 50 per cent, per lb. of contained Si	6.60@8.10c.
Ferrotungsten, 75 @ 80 per cent, lb. of W contained	$1.90
Ferrovanadium, per lb. of V delivered	$2.70@$2.90
Silicomanganese, 1 per cent C, gross ton	$133.00

NON-METALLIC MINERALS

Asbestos, f.o.b. Canadian (Quebec) mines (U.S. funds), ton:	
Crude No. 1	$650@$758
Crude No. 2	$165@$385
Spinning fibers	$124@$233
Paper stock	$44@$49.50
Shorts	$14.50@$26.50
Vermont, f.o.b. Hyde Park:	
Shingle stock	$62.50@$65.00
Paper stock	$44.00@$53.00
Shorts	$14.50@$28.50
Floats	$19.50
Barytes, f.o.b. mines:	
Georgia, crude, per long ton	$8.50@$9.00
Missouri, 93 to 94 per cent $BaSO_4$, per short ton	$8.25@$8.50
Bauxite, long ton:	
Domestic, crude, 50 @ 52 per cent (not dried)	$5.00
Domestic, chemical, 55 @ 58 per cent	$7.50@$8.50
Domestic, abrasive, 80 @ 84 per cent	$16.50
China Clay, f.o.b. mines, ton:	
South Carolina and Georgia, No. 1, bulk	$6.75@$8.00
Delaware, No. 1	$15.00
Feldspar, bulk, ton:	
Potash feldspar, 200 mesh	$17.00
Glass spar, white, 20 mesh	$11.75
Fluorspar, f.o.b. mines, bulk, Kentucky and Illinois 60 per cent, all rail movement, ton	$30.00
Acid 98 and 1 per cent, bulk, ton	$37.00
Fuller's earth, f.o.b. Georgia or Florida, ton	$7.00@$14.00
Magnesite, per ton dead-burned, f.o.b. Washington	$22.00
Mica — Colonial Mica Corp., agent for Metals Reserve Co., quotes full-trimmed ruby muscovite domestic, April 1 to Sept. 30, inclusive — No. 1, $1.70 to $36.65 per lb., depending on size; No. 2, $1.25 to $26.00; No. 2 Inferior, 50c. to $16.00; No. 3, 25c. to $6.25. Prices f.o.b. nearest producer's rifting plant.	
Ocher, Georgia, ton	$19.00@$22.00
Pyrites, Spanish, per long ton unit of S, c i f. Atlantic ports	12c. nom.
Silica, in bags, 325 mesh, ton	$20.00@$40.00
Sulphur, Texas, mines, long ton	$16.00
Talc, f.o.b. works, ton:	
New York, double air-floated, 325 mesh	$12.00@$15.00
Vermont, extra white, 200 mesh	$9.50@$10.50
Tripoli, Missouri, ton:	
40 mesh, cream colored	$14.50

IRON AND STEEL

Pig Iron, Valley furnaces, gross ton: Basic	$24.50
Steel, base price, Pittsburgh Billets, gross ton	$36.00
Structural shapes, 100 lb.	$2.10

WASHINGTON REFLECTIONS

McGRAW-HILL WASHINGTON NEWS BUREAU

Draft Will Take All Able-Bodied Men Under Thirty

Mine operators may expect few deferments of men between 18 and 30 under the present tough draft policy of Selective Service. All men in the 18 to 30 age group are liable for military service unless it can be shown that a man is absolutely indispensable. Final decision is up to the local boards, but the reasons on which deferment will be granted are fewer than previously. This is in line with the Local Board Memorandum No. 77E and No. 115-J of May 22, 1945.

Selective Service maintains that the theory of deferments is to give time for industry to train replacements. Present policy is to defer men 30 and over. This puts the pressure on the under-30 age group to fill draft requirements. Rough estimates indicate that industry in general will lose from 18 to 20 thousand per month for the rest of the year to make up the difference between the number of men becoming 18 who are drafted and the Army requirements of about 65,000 per month. This figure does not include the Navy's requirements.

Selective Service looks to the pool of labor made up of discharged veterans to supply the replacements industry must have. Representatives of the mining industry argue this point, claiming that the release of veterans does not help relieve the labor shortage. It is their contention that the men returning to civil life at this time are those who were drafted early and thus are men who came from non-essential industry. These men are probably going back to the work for which they were trained and are best fitted—which is not mining.

Be that as it may, the Army is going ahead with its induction schedule, which means that by the end of the year the mines will have lost nearly all physically fit men in the 18 to 30 age group. After the first bite, which is expected to take as high as 20 percent of the total number liable for induction, the remaining men will go in monthly increments of approximately equal size. This is interpreted to mean that as present deferments expire they will not be renewed.

The only solution for mine operators is to train replacements now. No official of any of the affected agencies with whom contact has been made differs widely from this conclusion in either private or official views.

Mines can expect some help from two quarters. War production Board officials charged with the production of metals and minerals will do what they can to prevent a serious loss of output. Army representatives also are expected to adhere to the same idea. In the past, the Army has modified its plans to fit conditions when circumstances became bad enough. Nevertheless, the men will be taken and production at some mines will be badly curtailed.

Non-Cancellation Included in Premium-Quota Plan

At the eleventh hour, Congress passed the legislation to permit the continuation of the Premium-Quota plan until June 30, 1946. The non-cancellation clause of the Senate was included. The bill provides for payments not to exceed a total of $88,000,000. The non-cancellation requirement is stated in the following language, "Provided further, that the premium price plan for copper, lead and zinc shall be extended until June 30, 1946, on the same terms as heretofore, except that all classes of premiums shall be non-cancellable unless necessary in order to make individual adjustments of income to specific mines." This clause, originally in the bill but knocked out by the House, was restored in conference. (*EM&J*, June, 1945, page 107.)

In its final form, the bill as it pertains to the Premium-Quota plan is essentially the Senate version. The background of Senate attitude is to be found in the report of the Senate Committee on Banking and Currency, which is quoted in part as follows:

"The requirement that the extension of the plan shall be 'on the same terms as heretofore' assures the continuance of the subsidy on basic standards which have been employed in the administration of the plan. It does not, of course, preclude changes designed to improve administrative procedure.

"As mining is dependent upon development work and development work will only be done if there is a specific guaranty of reasonable prices for a definite time, permitting the rules of the premium price plan in this respect to be changeable or subject to cancellation at the will of the executive agencies would make it impossible for the mining industry and particularly the small mines to plan ahead on a definite basis.

"The provision for making adjustments of individual premiums while prohibiting cancellation 'across the board' is to preserve the present method of adjusting quotas upward and downward to return the producer a reasonable profit plus amortization and other allowances, and at the same time to prevent excessive windfalls due to development of richer ore bodies. In making such adjustments in specific cases, it may be necessary to cancel an individual C, B, or special additional copper premium, or later, if costs rise or grade of ore drops, to restore such premiums in whole or in part, but it is not intended that initial A quotas shall be raised. The committee did not wish to prevent necessary flexibility but did want to prohibit using cancellation as a mechanism for forcing mines to shut down. Neither is it intended to interfere with the right to add new classes of premiums if the agencies feel that this will benefit or increase the production of copper, lead, and zinc."

Enlarged Power to Cut Tariffs Is Retained

President Truman won his first major legislative victory when the Senate passed, without amendment, the House version of the Reciprocal Trade Agreement Act. The bill as sent to the White House for the President's signature was in the exact form requested by President Truman, and, before him, by President Roosevelt.

The Administration won its three-year extension of the Act with the power to reduce tariffs 50 percent from the duties in effect Jan. 1, 1945. However, the bill also contained the House amendment that emergency agreements entered into as war measures would not be considered. Rates which would have existed on Jan. 1, 1945, if such agreements had not been consummated, would be used.

The Senate Finance Committee had deleted the provision giving enlarged power to cut tariffs. Nevertheless, the Senate restored this power, and followed through the next day by defeating all of the proposed amendments which would have curbed the Presidential authority to change tariffs. In all, six amendments were defeated, including that of Senator McFarland to forbid rate reductions on any raw materials including metals, minerals, ores, and concentrates, as well as wool, livestock, and farm products.

The amendment most feared by the Administration was that of Senator O'Mahoney, which would have required the approval of both houses of Congress before any trade agreement could take effect.

Considerable attention has been given to the split in party lines revealed by the final Senate vote. An examination of the rollcall vote reveals that the tariff is still a local rather than a party question.

More Trucks Allotted For Industry Use

More trucks will be available for mining operations. An additional 188,000 trucks have been authorized for the second half of this year by WPB. These are in addition to the production quotas for 1945 which have already been allocated to truck manufacturers. The new authorization will provide approximately 700 additional off-the-highway units this year, bringing the total to more than 2,100.

Tariff Commission Predicts Futures of Various Metals

The Tariff Commission has issued a limited number of copies of its voluminous report on "Post-War Import Trade of the United States and Production of Related Items." This report is in response to the instructions of Senate Resolution 341, 78th Congress. It is understood that the report, now in mimeograph form, will be printed for general distribution, possibly with some alterations.

The average reader will be disappointed in the conclusions, enmeshed as they are in a web of assumptions laid down in the directive resolution, and will be inclined to dismiss the whole treatment as academic. The report treats each subject with a general historical summary, then discusses the postwar short-term and long-term outlooks. The latter involves two assumed alternative conditions: (a) that per-capita national income will remain at the 1939 level, and (b) that per-capita income will be 75 percent above 1939. Under each of these conditions the study undertakes to project the situation with (1) the duty remaining as in 1939, (2) duty reduced by 50 percent, and (3) duty increased by 50 percent. The report takes 17 pages to explain the import of these assumptions, and the conclusions, thus circumscribed, are likely to leave most readers in a state of confusion.

In the mineral field, the report covers: pig iron, iron and steel scrap, spiegeleisen, manganese ore, tungsten, ferromanganese, ferrosilicon, ferrosilicon aluminum, calcium silicide, aluminum, antimony, bismuth, cadmium, mercury, nickel, lead, zinc, chromite, coke, coal, cobalt, copper, corundum, platinum, iron ore, tantalite-columbite, vanadium, ilmenite, selenium, and tin.

An analysis of the principal conclusions on copper, lead, and zinc is given in the accompanying table.

Funds for Access Roads Are Reduced One-Third

Additional funds to be provided for the construction of access roads were cut considerably by the House Roads Committee when H.R. 2840 was reported out. Money for access roads was trimmed to $5,500,000 from an original amount of $7,500,000. These lower figures were the result of revised estimates made after V-E Day.

At the hearings on the bill, the committee sought to find out exactly what type of projects would be benefited. Access roads to timber and coal lands were the most important for the war effort, according to the witnesses, with metals trailing far behind in essentiality. A road to open a new lead mine would no doubt be an exception.

An attempt was made to provide money for construction of access roads after V-J Day. Members of the Roads Committee were at pains to see that the projects contemplated under the new authorization are for the war only. Opponents to extension of the Act claimed that WPB cannot legally plan for actions to take place after the war ends. They also opposed the use of funds for the further development of mineral properties on the grounds that there is not sufficient labor available to man the mines now operating. Finally, the opponents claimed that construction of access roads after the war is covered in laws already on the books. They contended that under the secondary road program (the farm to market road program), access roads can be built if a local sponsor will put up half of the money.

With much talk of a Congressional recess starting between July 10 and July 15, there was doubt whether the bill would be acted on by the House before adjournment. Those pushing the bill were hopeful that if the House should pass the measure, the Senate would act upon it the same day.

Tariff Commission Predictions for Copper, Lead, and Zinc

	MINE PRODUCTION		NET IMPORTS	
	Quantity (000 tons)	Metal Price (cts. per lb.)	Quantity (000 tons)	Metal Price (cts. per lb.)
COPPER				
1939 income level:				
1939 duty	550-650	11.0	.....	...
Duty cut 50%	500-600	10.0	50-100	8.0
Duty up 50%	550-600	11.5	.....	...
Income 75% over 1939:				
1939 duty	800-1000	14.5	375-425	11.0
Duty cut 50%	750-850	13.0	525-575	11.5
Duty up 50%	875-975	15.5	300-350	10.0
LEAD				
1939 income level:				
1939 duty	425	5.0	25	3.2
Duty cut 50%	400	4.75	75	3.5
Duty up 50%	425	5.25	.....	3.0
Income 75% over 1939:				
1939 duty	450-500	6.0 -6.5	150-300	5.0
Duty cut 50%	450-500	5.75-6.25	185-350	5.25
Duty up 50%	450-500	6.25-6.75	115-250	4.75
ZINC				
1939 income level:				
1939 duty	500-550	6.0	65-115	3.00
Duty cut 50%	450-500	5.5	140-190	3.25
Duty up 50%	525-575	6.5	15- 65	2.75
Income 75% over 1939:				
1939 duty	550-600	7.5	220-270	3.75
Duty cut 50%	500-550	7.0	295-345	4.00
Duty up 50%	575-625	8.0	170-220	3.50

WPB Cancels Limitation Order on Uses of Zinc

Although all restrictions on the use of zinc have been lifted, WPB believes that the supply will continue to be tight. The supply and requirements are in balance on the war uses plus known civilian demands. The rate of consumption that may develop with all bars down is what WPB fears may outstrip production. War Production Board officials consider this more than a possibility—almost a certainty. However, people in the trade do not expect a shortage.

The big cutbacks in military requirements are for brass, which has resulted in the release of a certain amount of high-grade zinc. This does not affect the galvanizing program, now at a record level. Present rate galvanizing is 30,000 tons a month in round figures.

Other figures that will shed light on the present zinc supply are those for the stocks. Total present stocks amount to approximately 800,000 tons, of which 500,000 tons are recoverable from concentrates and 300,000 tons are metal. These are round figures covering both Government and private stocks, including consumer inventories of approximately 100,000 tons.

This viewpoint explains why WPB said the effect of lifting the restrictions on the use of zinc will be merely to give zinc purchasers a "hunting license," as zinc continues in tight supply. The present plan is to require each seller of zinc to hold the bulk of his output until the 10th or 15th of each month in order to assure a supply for essential users. After this date each month each seller would be at liberty to dispose of what remained.

NEWS OF THE INDUSTRY

Gold Mine Closing Order Is Finally Cancelled

L-208 has been revoked. WPB announced on June 16, "Resumption of gold mining will be permitted through the revocation of order L-208, effective July 1, 1945...." Immediately after the announcement that gold mining could be resumed, Homestake Mining Co. was reported to be planning the reopening of its South Dakota property on July 2.

The WPB action followed the lifting of restrictions on the development of new mining properties in Canada by a little more than a week.

At the time the announcement was made, representatives of WPB explained that the principal problems facing gold mine operators were shortages of labor and equipment. The shortage of mine labor, particularly in the lead mines, is so acute that no relaxation of the present manpower restrictions could be expected. The equipment difficulties were eased by an amendment to order P-56, which permits gold mines formerly under L-208 to assume the status of non-serialized mines to secure their needed repair and maintenance supplies. This entitles them to an AA-5 rating. Thus, no critical equipment will be given gold mines under order P-56. After July 1, however, gold producers can purchase capital equipment on an unrated basis in the same manner available to others requiring it.

Opinion among mining men in Washington is that economic conditions are unfavorable for opening many gold mines. The unfavorable conditions include not only the higher prices of equipment and labor, both of which have increased since the beginning of the war, but also the shortage of many supplies. For example, the short supply of textiles will adversely affect the ability of gold mines to secure filter cloth, belting, work clothing, gloves, and the like.

It also is feared that some properties have seriously deteriorated in the almost three years of enforced idleness and that many months will be required for them to be restored to operating condition.

Great Britain Raises Gold-Buying Price

The price which Britain offers to pay for gold offered to her in the United Kingdom and all other parts of the sterling area was raised from 168s. to 172s. 3d. on June 9. The Government announced that the old price had been fixed early in the war when high shipping and insurance costs had to be deducted at wartime rates from gross proceeds of the sale of gold delivered to New York. Net proceeds, which are now higher because of the war situation, permitted the upward price revision. Official announcements emphasize that the readjusted price should not be regarded as a gold point, nor has it any bearing on questions of exchange policy or exchange rates. On the basis of $4.04 for sterling, the present official exchange rate, the new price for gold offered by the Bank of England is $34.7945 an ounce.

Montana Bureau Plans Aid to Mineral Industry

Hard-rock miners, placer and dredge operations, gas and oil operators, coal producers, and State Chambers of Commerce, as well as federal and state officials, met with a member of the State Board of Education, the Local Executive Board of Montana School of Mines, and the Bureau of Mines and Geology staff at Butte, on June 16, to discuss a program of the Bureau which is expected to stimulate Montana's mineral industry.

For a number of years the work of the Montana Bureau has been restricted because of limited appropriations. However, the 1945 Legislature allotted the Bureau $25,000 per year for the next biennium beginning July 1, 1945, part of which was to be spent to help the small operators and prospectors in the discovery and development of new mineral deposits and provide technical advice.

Dr. Thomson, president of the Montana School of Mines, and the Bureau of Mines staff presented a program which covered lode mining, placer mining, non-metallics, oil and gas, coal, and ground water, and included aid to prospectors and small operators, mineral dressing, and the preparation of state maps.

NMC Approves Arizona Wage Rate Agreement

Voluntary wage rate agreements affecting more than 4,300 employees of the Phelps Dodge Corporation in Arizona were approved by the Non-Ferrous Metals Commission on June 10. The new schedule provides for pay raises ranging from 9c. to 13c. an hour for all the less skilled occupations. Virtually no increases were proposed for top skilled jobs. The average increase allowed amounts to 3.39c. an hour.

The adjustments are retroactive to March 1, 1945, under agreement between the company and the unions, the International Union of Mine, Mill and Smelter Workers, CIO, and the Metal Trades Council, AFL, of Bisbee, Douglas, Ajo, and Verde district, which represented all but 271 of the employees.

The approved agreement grew out of disputes between the company and the unions more than a year ago. The commission denied wage increases demanded by the unions, because a piecemeal approach had been made toward correcting inequities, and urged the company and the unions to negotiate and submit a balanced wage structure.

Intraplant inequities had existed in the Arizona operations of the company at Bisbee, Douglas, Ajo, Morenci, Jerome, and Clarkdale, marked principally by a multiplicity of wage rates, which were reduced by the joint proposals of the company and the unions from 33 to 11.

Canada Rescinds Order Restricting Gold Mining

All Metals Control restrictions on the mining of gold, and of other metals or minerals, have been removed according to an announcement on June 7 by Mr. Howe, Munitions Minister. The original order was designed to conserve manpower and machinery, and prohibited all expansion of existing mines and development of new properties after June 22, 1942, except by Metals Control permit.

"Mining labor is still under strict control by National Selective Service, and it may be some months before machinery becomes available," said Mr. Howe. "The removal of restrictions is in line with the policy of the government in rescinding all limitations on civilian industry as quickly as conditions warrant."

All restrictions on the sinking of mine shafts and the expansion of underground work and the opening of new mines have been lifted, and mining operators will be able to plan new developments in the near future.

Mr. Howe explained that prospecting and surface diamond drilling have not been restricted, because it was necessary to search for base and strategic metals and minerals. He stated that important discoveries of tungsten, molybdenum, and copper have been made, and added that a number of promising gold properties have been discovered and partly developed by surface drilling.

Canadian gold producers expect some delay because of shortages of certain types of machinery.

Western Economic and Mining Affiliates Urges Establishment of Bimetallic System

Group Condemns Managed Currencies, and Urges Adoption of Hard Money—Objects to Government Grants of Machinery Purchase Ratings to Foreign Gold Mines

Mining men from eight Western states who attended a session of the Western Economic and Mining Affiliates, Inc., at Boise, Idaho, on May 25 and 26, adopted the following resolutions pertaining to precious metals and national monetary policies:

"The gold mining industry of the United States is united in its support of our President, Harry S. Truman, our Armed Forces, and our Congress in making every effort to complete the victory over the country's enemies, thus making it possible for a great many of the members of our armed forces to return to their peace-time pursuits, including the many gold miners who are now fighting for our country on the far-flung battle fronts.

"We accept our responsibility with respect to the immediate problem of re-employment of those who desire again to make their livelihood in the gold mining industry of America. We urge the prompt rescinding of the Gold Mine Closing Order, known as L-208, with due consideration being given to the immediate needs of the industry with respect to equipment, supplies, and the additional burdens placed upon the industry by the pursuance of governmental policies and economic trends which have changed considerably conditions under which we must operate since the issuance of the order. The order was ill-advised in that it never accomplished its stated purpose of diverting manpower and materials into strategic metal mines but instead worked undue hardship on many communities in which the production of gold is usually carried on, while we have seen gold producers in allied countries continue production throughout the war, sending their gold to the United States, and in many instances, using equipment manufactured in this country, the use of which was denied American producers.

"When Order L-208 is rescinded, between six months' and one year's time will be required for our gold mines to replace equipment that was commandeered for the war effort. Prompt action to permit resumption of gold mining is necessary to start planning jobs for the returning veteran.

"We believe in the American system of government, including our historically sound monetary structure, based on gold and silver, which has carried us through many periods of stress to world leadership.

"We deplore the recent unfortunate utterances of Marriner Eccles and others in governmental positions with respect to gold, which embody a foreign ideology, not suitable to this country. We can understand spokesmen from other countries whose gold reserves are temporarily exhausted, criticizing our time-honored and tested monetary system in which our people have such a huge stake, but we take sharp issue with any governmental official of this country who attacks the very foundation of our monetary structure, depending as it does on public confidence based on gold and silver as a safeguard against debauchery of our currency.

"We insist upon the continuation of our monetary policy as announced by Congress on Nov. 1, 1893, as follows:

"'It is hereby declared to be the policy of the United States to continue the use of both gold and silver as standard money and to coin both gold and silver into money of equal intrinsic and exchangeable value, such equality to be secured through international agreement, or by such safeguards of legislation as will insure maintenance of the parity in value of the coins of the two metals, and the equal power of every dollar at all times in the markets and in the payment of debts. And it is hereby further declared that the efforts of the government shall be steadily directed to the establishment of such a safe system of bimetallism as will maintain at all times the equal power of every dollar coined or issued by the United States and in the payment of debts.'

"and the guarding by Congress of its Constitutional power (Art. I, Sec. 8, PP5, which provides that 'Congress shall have the power to coin money, regulate the value thereof, and of foreign coin'), given it by the people against encroachment by any international agreement or treaty or by the enactment of any legislation limiting the power of Congress in this respect.

"Our people have confidence in hard money supported by gold and silver, for they know that this money is the money of free men and that paper money has been used in foreign countries to pay slave labor, and has, invariably, disrupted the economy of the countries using such paper currency. The disaster, poverty and hardship which has resulted to the people of those countries in which managed currency unsupported by a metallic base has been attempted, justify a strong position on the part of all thinking Americans against any trend in that direction in this country. We had bitter experience with greenback currency following the Civil War and remember full well the experiences of Germany following World War I. We have the example of paper currency inflation in Greece today, as well as in China where the Chinese Government has made a strong appeal for American gold to save its currency structure.

"Confidence in currency is essential for the well-being of our people. Confidence in gold has been the inherent trait of people for centuries and has been recognized in law and in fact by our people since the Declaration of Independence. It is impossible to change human nature and we urge that government officials who have seen fit to attack gold and silver desist from their attacks and restore confidence in the monetary structure of our government. The immediate circulation of gold would help to this end. We call attention to the fact that this gold belongs to the people of the United States, other than that earmarked for foreign countries, and that it is not the personal property of any public official or group of officials. It should be safeguarded with the utmost discretion on the part of every public official and the monetary policies on which our country was founded and developed should be strictly upheld and defended.

"We recommend that encouragement be extended to producers of the precious metals, not only in the United States, but throughout this hemisphere, and we believe that encouragement of the production of these metals will add much to North and South American solidarity. Contrary to general belief, the world price of $35 was established by economic forces acting throughout the world. This was later recognized by our government and since that time gold has been selling at a higher price than $35 on certain foreign markets. Pending re-establishment of a stabilized international price for gold, we urge that the right to sell newly mined gold in foreign markets be extended to domestic producers.

"We commend those leaders in the Senate and House of Representatives who have, by their actions, demonstrated a knowledge of the monetary system of our nation.

"The professed objectives of the Bretton Woods conference are worthy of consideration. The methods proposed to attain those objectives especially with respect to the stabilization fund, as incorporated in H.R. 2211, are contrary to the best interest of the people of the United States. We favor the adoption of the amendment to be offered by Senator Elmer Thomas of Oklahoma, giving recognition to the fundamental principles and monetary policies heretofore adhered to by the legislative branch of our government.

"While this conference is primarily concerned with the precious metals, we fully appreciate the fact that one or both of the precious metals are

found in conjunction with the nonferrous base metals in this area and that any policy detrimental to the encouragement of the production of precious metals would drastically affect the cost of production of the base metals as well as precious metals and would restrict production of both.

"Looking forward to the postwar period when venture capital should take the place of federal loans for the development of present or new mines, and when essential productive work instead of W.P.A. projects should be provided for the returning serviceman, we strongly urge that the present restrictive taxes on venture capital in mining be removed by an act of Congress to permit such mine-development costs to be treated as direct mining costs, deductible in computing net income.

"We respectfully urge and petition that the Senate of the United States appoint a special committee to investigate the administration of the gold closing order L-208, with special reference to high priorities and approval given by the War Production Board for manufacturers of the United States to furnish hundreds of millions of dollars of gold mining machinery to foreign countries while at the same time denying equipment and supplies to gold mines of the United States. Also, to determine why so-called small gold mines in Central and South America were granted P-56 serial numbers and authorized to purchase gold mining machinery and supplies in the United States, without regard to quantity, and under which authority many of these mines stocked up with supplies to last several years while all gold mines in the United States were closed down by order L-208."

Tariff Cuts Opposed In National Poll

Only 28 percent of the American public is willing to allow foreign goods to enter this country in competion with things we grow or make here—even if the prices are lower, according to an independent nationwide survey made by the National Opinion Research Center, University of Denver, Colo.

The following table is derived from a chart prepared by N.O.R.C. which indicates the attitude of the American public on the tariff and other sacrifices which might be involved in a world union:

Question: In order to try out a union of nations as a possible way of preventing wars, would you be willing or not willing to:

	Willing	Unwilling	No Opinion
Allow competitive imports, even if prices were lower.	28%	62%	10%
Consider most lend-lease as gifts	41%	49%	10%
Forget reparations from Germany or Japan	28%	64%	8%

U. S. Supreme Court Denies NLRB Petition

The Supreme Court of the United States decided on May 28 that the National Labor Relations Board, after seeking and obtaining a court order of enforcement of its own order, is not entitled to have provisions of the decree prescribing the nature of the remedy set aside and the case remanded to it.

The decision grew out of dispute between the International Union of Mine, Mill and Smelter Workers, and the Eagle-Picher Mining & Smelting Co., and the Eagle-Picher Lead Co., in which the National Labor Relations Board ordered the employers to cease certain unfair labor practices and reinstate 209 employees. A formula for the calculation of back pay was also devised by the Board.

Following a petition for review by the companies, in November, 1939, the Circuit Court of Appeals upheld the Board's order, and decreed enforcement on May 21, 1941, whereupon the companies offered reinstatement to 209 employees, and tendered back pay amounting to $8,409.39, at the same time maintaining that the amount should have been only $5,400 under the formula set by the Board.

After investigation, the Board decided that it had made a mistake in framing its formula, but did not file a petition for vacating paragraphs relating to computation of back pay until Feb. 1, 1943, two years later. The Board's petition and an accompanying petition for modification filed by the unions which would have increased back pay indemnities to approximately $800,000 were denied by the Appellate Court. The case then went to the Supreme Court.

In the majority opinion of the Supreme Court delivered by Mr. Justice Roberts it was emphasized that the original order was reviewed in the absence of fraud or mistake induced by the companies, and maintained that it would be unfair to uphold the petitioners (union) because the companies had elected to comply with the decree of the Circuit Court of Appeals, "only to be confronted, years later, with an attempt to rewrite a portion of that decree at a time when their right of review of other portions of it had expired" because of expiration of the Circuit Court's term.

Four justices joined in a dissenting opinion which asserted that the Board's "mistake" really meant that employees would only receive $5,400 instead of $800,000 in back pay, a loss of nearly $795,000 in unpaid back wages resulting from unfair labor practices of the companies. "To deny a remand under such circumstances is to abuse a court's discretion" the opinion stated, "and to transform the judicial system into a weapon against the innocent victims of an administrative error."

NEWS BRIEFS

New Geologic Map of Canada. The Department of Mines and Resources, Ottawa, announces a new geologic map of Canada which measures 4x5 ft. and consists of two sheets, an eastern and western. Unmounted sets may be obtained from the Chief, Bureau of Geology and Topography, Department of Mines and Resources, Ottawa, for 50c., or 25c. for either Eastern or Western sheet.

Aluminum Bearings. Bearings of aluminum alloy are being produced by the Aluminum Company of America and have been accepted for heavy-duty work by a number of manufacturers. High heat conductivity is mentioned in the "Aluminum News Letter" as one of the characteristics of the product.

Silver-Bearing Bearings. Ford engineers have developed a tri-alloy bearing containing 35 to 40 percent lead, 4½ to 5 percent silver, remainder copper, with a trace of iron. The bearing will be used by Ford as a substitute for the cadmium bearings formerly used.

China Raises Gold Price Again. The Ministry of Finance announced on June 9 an increase in the price of gold from 35,000 to 40,000 Chinese dollars per ounce. This followed an increase on March 28 from 20,000 to 35,000 Chinese dollars. The black market value of American currency increased from $1,000 Chinese to $1 American, to $1,150 to $1 American on June 9.

Correction. The item describing three-quarter mile pipe lengths and the method of laying them in the English Channel as published in June News Briefs applied in part to British operations. A corrected description of the pipe and method of laying it appears on page 118.

Chilean Mine Fire Causes Many Deaths

Fire, originating in an underground shop of the Braden Copper Co.'s Sewell mine, caused the death of nearly 500 men on June 19, according to recent press dispatches from Rancagua, Chile. An investigation disclosed that the fire was started by a spark from a blacksmith's forge which fell into a pile of oil-soaked waste and ignited a fuel oil drum. The bodies of 420 miners who were suffocated by smoke were removed two days later, and the toll was expected to mount to about 500.

Gordon Lee, an American mining engineer of Aberdeen, S. D., was reported to have saved the lives of 400 workers by leading them to safety through a maze of tunnels.

To meet the increased haulage needs in today's mines, quarries and tunnel operations, abundant battery power must be available from the start of the shift to the very end. Trammers, locomotives and shuttlecars must be kept pulling strong and steadily. When the motive power is supplied by Exide Batteries you can be assured of sustained speeds throughout the day.

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NEW BOOKS

MINING YEAR BOOK, 1945. Published by Walter E. Skinner, 20 Copthall Ave., London, E.C.2. Price 26s. net, post free abroad.

The 59th annual issue of this standard reference work contains complete and up-to-date information about 811 mining companies operating in all parts of the world, together with a list of names and addresses of 873 mining engineers and managers connected with the companies mentioned in the book. Changes that have occurred during the past year are recorded. Other features are maps and plans of various properties, statistical tables of gold production in the principal mining fields, and a supplementary list of companies that have been mentioned in previous volumes.

YEAR BOOK OF THE AMERICAN BUREAU OF METAL STATISTICS, 1944. W. R. Ingalls, Director. 33 Rector St., New York, N. Y. P. 112. Price $2.

Although restrictions on publication of non-ferrous metal statistics are not yet wholly relaxed, they have been sufficiently rescinded to permit the 24th annual issue of this standard reference work to offer a more comprehensive survey of data than was possible a year ago. Import and export statistics for 1943 and 1944 are not released, and the production of tin is not wholly clear. Of course, nothing is known of production and consumption in the Axis countries and those dominated by them. Nevertheless, new data have been revealed on hitherto unknown production and consumption, through the activities of the Bureau of Mines, War Production Board, and Bureau of the Census. Dr. Ingalls discusses the details of these and other matters in an introductory note that should be read by all who use the Year Book and rely upon it for its customary information on copper, lead, zinc, gold and silver, and miscellaneous metals.

MINERALS YEARBOOK, 1943. U. S. Bureau of Mines. For sale only by Superintendent of Documents, Government Printing Office, Washington 25, D. C. Price $2.50.

Relaxation of security regulations permits the public release of this heretofore confidential 1943 volume on the production, distribution, and consumption of mineral commodities. It contains separate chapters reviewing all known minerals in daily use—metallic, non-metallic or industrial, and fuels. There is also a section on international aspects of war mineral procurement, and a statistical summary of mineral production making current for the first time since 1931 the detailed output by states. Sections in the various chapters cover the postwar outlook on all but a few of the mineral treated.

PUBLICATIONS RECEIVED

The U. S. Geological Survey, Washington 25, D. C., has issued geological maps and reports on mineral deposits in various parts of the country, each available as indicated below:

"Copper, Lead, Zinc." Report and geology of the San Pedro copper mine and the Carnahan lead-zinc mine, New Placers district, Santa Fe County, N. M. For public inspection at Survey offices in Washington, D. C., and Rolla, Mo., and office of the Conservation Branch, Carlsbad, N. M.

"Tungsten." Surface and mine geology of the Hi Peak mine, Kern County, Calif., obtainable on request to the Director. Also final report on geology of the "Hamme district" in Vance County, N. C., and Mecklenburg County, Va., on file in the Library of the Survey, Washington, D. C.; Eastern Regional office of the Survey, College Park, Md.; Virginia Geological Survey, Charlottesville, Va.; Division of Mineral Resources, Raleigh, N. C.; and Perry Memorial Library, Henderson, N. C.

"Manganese, Iron, Copper." Two reports on deposits in the Berkshire Hills, Franklin and Hampshire counties, Mass. On file at the Survey offices in Washington, D. C.; Massachusetts Department of Public Works, Boston, and Massachusetts Development and Industrial Commission, Boston.

"Magnetite." Preliminary geologic report on parts of Cranberry Lake and Tupper Lake quadrangles, northwest Adirondack magnetite district, New York. Also, magnetometer survey of Triassic-Cambrian contact near Boyertown, Pa. Also geological report of the Sterling-Ringwood district of New York and New Jersey. On application to the Director.

"Zinc." Geologic map and report on the Meekers Grove area, Wisconsin. On request to the Director. Also report and maps on the Carbo zinc prospect, Northport district, Stevens County, Wash., on open file at the offices of the Survey, Washington, D. C., and Room 707, Peyton Bldg., Spokane, Wash.

"Iron." Geologic report and maps of Dayton iron deposits, Lyon County, Nev. On request to the Director. Also report and maps of Mineral Hills iron district, Iron County, Mich., on application to the Director, Washington, D. C., or to the State Geologist, Lansing, Mich. Also geologic report on Richmond iron district, Berkshire Valley, Mass., on open file at the offices of the Survey, Washington, D. C., the Massachusetts Department of Public Works and the Massachusetts Development and Industrial Commission, Boston, and in the library of the Massachusetts State College, Amherst.

"Vanadium." Preliminary map and text on vanadium deposits in Mesa County, Colo., and Grant County, Utah. For sale by the Director, Washington 25, D. C., at 25c. each.

"Fluorspar." Preliminary large-scale geologic and topographic map, with property index and text, of central part of western Kentucky-southern Illinois fluorspar district. Also mine maps and sections of the Royal mine, Livingston County, Ky. Both on open file in the offices of the Survey, Washington, D. C., and Rolla, Mo., and the post office, Marion, Ky.

"Manganese." Geologic and topographic maps of manganese properties in the following counties of California: Amador, Calaveras, Eldorado, Glenn, Humbolt, Los Angeles, Madera, Mariposa, Mendocino, Mono, Placer, Plumas, San Bernardino, San Benito, San Luis Obispo, San Joaquin, Sonoma, Stanislaus, Trinity, Tuolumne. On open file at the offices of the Survey, Washington, D. C., and at California Division of Mines, Ferry Bldg., San Francisco.

"Quicksilver." Preliminary report, maps and diagrams of deposits in the DeCourcy Mountain area, Iditarod district, southwestern Alaska. On request to the Director.

The U. S. Bureau of Mines, Washington 25, D. C., has issued the following publications, available free on application, except as indicated:

"Diamond Drilling of Blast Holes, Lake Superior District, Iron-Ore Mines." I. C. 7317. By E. W. Johnson and F. E. Cash.

"Electronic Mine-Shaft Signal System at Magma Copper Co., Superior, Ariz." I.C. 7318. By H. C. Loesche.

"Survey of the Suitability of Domestic Talcs for High-Frequency Insulators." R.I. 3804. By T. A. Klinefelter, S. Speil, and S. Gottlieb.

"Electrolysis of Magnesium Into Liquid Cathodes From MgO-Carbon Suspensions in Molten Chlorides." R.I. 3805. By B. Cartwright, L. R. Michels, and S. F. Ravitz.

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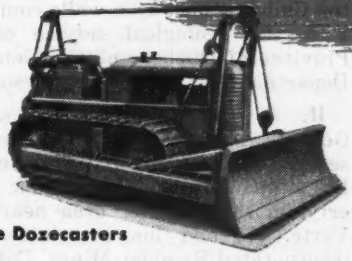
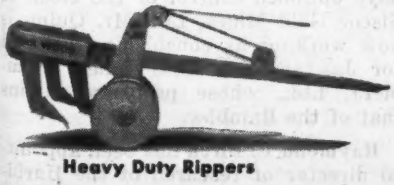


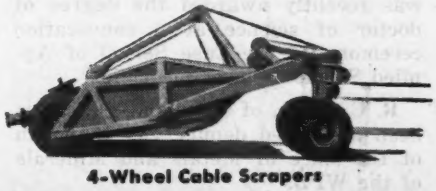
Cable Dozecasters

4-Wheel Hydraulic Scrapers

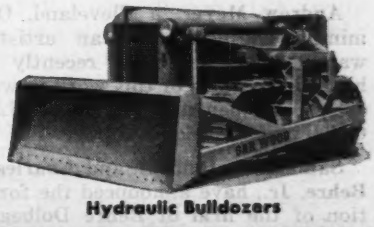
2-Wheel Hydraulic Scrapers



Heavy Duty Rippers



4-Wheel Cable Scrapers



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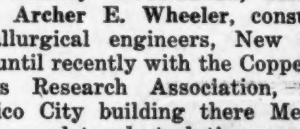
PERSONAL NEWS

J. Stanley McClenahan, formerly with **Archer E. Wheeler,** consulting metallurgical engineers, New York, and until recently with the Copper and Brass Research Association, is in Mexico City building there Mexico's first complete electrolytic copper refinery for Cobre de Mexico, S. A., composed of prominent Mexican bankers. The plant is expected to be in operation within the next few months. Mr. McClenahan also designed the El Paso, Texas, refinery for Phelps Dodge Corporation, and the Pyschma refinery for the Russian Government near Sverdlovsk, in the Ural Mountains, U.S.S.R.



J. STANLEY McCLENAHAN

William Furguson, Richard Seamens, and **I. M. Garfield,** of Boston, Mass., active in the affairs of the Keeweenaw Land Association and the Newport Land Co., visited the Menominee and Geogebic ranges the latter part of May. They were accompanied on the trip by **C. C. Taylor,** chief engineer and agent of these two companies, who are fee owners of mining properties of these ranges.

Daniel Geary, until recently of Upper Montclair, N. J., may now be addressed as Pvt. Daniel Geary, No. 42153095, Co. B., 192d Inf., 60 Camp Blanding, Florida.

Andrew Meyer, a Cleveland, Ohio, mining engineer, and an artist in water color painting, recently exhibited examples of this work in water colors and pen and ink at the Little Gallery of Cleveland College.

Samuel H. Dolbear and **Charles H. Behre, Jr.,** have announced the formation of the firm of Behre Dolbear & Co., consultants in the mineral industries, mining, metallurgy, and geology. Associated with them will be **H. Foster Bain, W. F. Boericke, J. F. Geary, G. A. Joslin, C. C. Morfit, Walter A. Rukeyser,** and **Herbert Waterman.** The addresses of the new organization are 11 Broadway, New York 4, N. Y., and 704 South Spring St., Los Angeles 14, Calif.

John C. MacIntosh has joined the staff of Cananea Consolidated Copper Co., of Cananea, Sonora, Mexico, as assistant mill superintendent.

F. C. Armstrong, geologist, has become head of the Spokane office of the U. S. Geological Survey, succeeding **Phil Shenon,** who was summoned by the Army to take charge of geological investigations in the Pacific.

Fred C. Rockwell, of Lexington, Va., has been named director of the Miscellaneous Minerals Division of the War Production Board.

C. Earl Rodgers, who has been engaged for the past three years as wartime technologist in the Office of the Director of Mines and Geology Branch of the Department of Mines and Resources at Ottawa, has arranged to be released early in June. After the summer vacation he will resume practice as a consulting mining engineer, probably at 330 Bay St., Toronto.

Donald M. Fraser, assistant geologist, Bethlehem Steel Co., has been appointed to the position of chief geologist left vacant by the recent death of W. L. Cumings. Dr. Fraser is a native of Pueblo, Colo., and a graduate of the University of Oregon. He took his doctor's degree at Columbia University. He taught for some time at Occidental College, Los Angeles, and also held a position with California State Division of Mines. In 1931 he joined the teaching staff at Lehigh University, where he remained until 1941, when he resigned to enter the employment of Bethlehem.

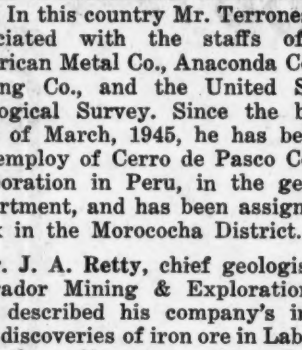
Miles K. Smith, metallurgical engineer, has recently become associated with **William H. Phillips,** vice president, and **Norman F. Tisdale,** chief metallurgist, in the Pittsburgh office of the Molybdenum Corporation of America.

Clyde Williams, director of Battelle Memorial Institute, Columbus, Ohio, was recently awarded the degree of doctor of science at a convocation ceremony of the Case School of Applied Science, Cleveland, Ohio.

R. C. Allen, of Cleveland, Ohio, has been appointed deputy vice chairman of the office of Metals and Minerals of the WPB.

Alberto J. Terrones Langone, geologist, has returned to Mexico City after having received from Nelson Rockefeller, Coordinator of Inter-American Affairs, a diploma for having completed two years of professional work in the United States in the period 1942-44 under the auspices of the Interamerican Trade Scholarship. In this country Mr. Terrones was associated with the staffs of the American Metal Co., Anaconda Copper Mining Co., and the United States Geological Survey. Since the beginning of March, 1945, he has been in the employ of Cerro de Pasco Copper Corporation in Peru, in the geology department, and has been assigned to work in the Morococha District.

Dr. J. A. Retty, chief geologist for Labrador Mining & Exploration Co. who described his company's important discoveries of iron ore in Labrador and the adjacent portion of New Quebec at the recent annual meeting of the Canadian Institute of Mining and Metallurgy, has been with the Labrador company since 1936. Previously he made geological investigations in northwestern Quebec and in the Chibougamau area while connected with the geological service of the Province of Quebec and the Dominion Department of Mines and Resources.



DR. J. A. RETTY

H. A. Quinn resigned from the Geological Survey of Newfoundland several months ago and optioned the England-Wells gold-copper-zinc property, in the Rambler area near Baie Verte. He and his associates have incorporated Rambler Mines, Ltd., and have optioned control of the stock to Siscoe Gold Mines, Ltd. Mr. Quinn is now working as consulting geologist for Jawtam Key Gold Zones (Rambler), Ltd., whose property adjoins that of the Rambler.

Raymond E. Birch has been appointed director of research of the Harbison-Walker Refractories Co., Pittsburgh, Pa., to succeed the late Fred A. Harvey.

Dr. Lisle A. Rose has been elected by the Board of Control of the Michigan College of Mining and Technology to be director of the newly formed

Public Relations Division of the institution.

Solomon R. Guggenheim, head of Guggenheim Brothers, and the only surviving member of the group of brothers of that name who founded the firm, was made a Commander of the Order Al Merito by the government of Chile on June 14, in recognition of his services to that country. The presentation of the decoration was made at a luncheon, held at the Bankers Club, 120 Broadway, New York, by **Alfonzo Grez**, Chilean Consul General. **Horace R. Graham**, president of the Anglo-Chilean Nitrate Corporation, presided. Mr. Guggenheim is 84 years old.

Charles E. Hunter has returned from Rio de Janeiro to his former post as geologist with T.V.A. His offices are in the Jackson Building, at Asheville, N. C. While in Brazil he had been acting as geologist for the Foreign Economic Administration.

Edgar L. Rossin, vice president of Miami Copper Co., has been elected a member of the board of South American Gold & Platinum Co.

Neil M. Gibson, recently with the geological department of Bethlehem Steel, has gone to the West Coast to engage in gold dredging. He may be reached by addressing Box 907, Grass Valley, Calif.

John C. Kinnear has been made vice president in charge of the Southwest Division of Kennecott Copper, succeeding W. S. Boyd.

Leslie S. Taylor, formerly with National Lead, is now mill superintendent with Ancor Corporation.

D. Hutchinson is now mine manager of South African Manganese, Ltd.

W. G. Donaldson, Frank Erno, and **George L. H. Loram**, members of the staff of H. W. Gould & Co., San Francisco, have left for Honduras, C. A., to investigate a gold property in the Santa Rosa de Copan area.

George W. Hallock was reelected president of the California Hydraulic Mining Association at a recent meeting held in Grass Valley, Calif. **Fred E. Brown** was elected vice president and **W. W. Esterly**, secretary.

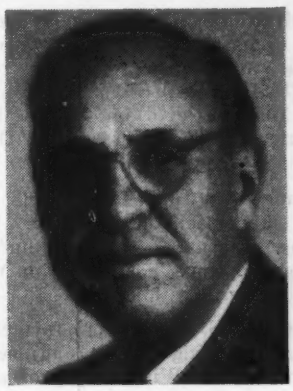
Ernest Clover, formerly production engineer with the Inca Division of Phelps Dodge Corporation, has joined the staff of Thermador Electrical Manufacturing Co., Los Angeles.

Dr. Y. C. Cheng, of the Geological Survey of China, is visiting the United States and Canada for the National Resources Commission of China. His objective is geological research.

Dr. Lawrence McKinley Gould, professor of geology and geography at Carleton College, Northfield, Minn., for the past 13 years, has been elected president of the college. Dr. Gould, a graduate of the University of Michigan, is widely known as a scientist, explorer, author, lecturer, and teacher. He is Acting Director of the Arctic Institute of North America.

F. S. Elfred, Jr., has been made general manager of the explosives division of Olin Industries, Inc., East Alton, Ill. He also will act as general manager of the Equitable Powder Manufacturing Co., of East Alton, and its affiliates.

Albert Hermon Case was on June 9 awarded the honorary degree of doctor of engineering by the State Board of Agriculture and Michigan State College, East Lansing, Mich. He received his degree in mining engineering at Columbia in 1905 and has been active in mining, industrial, executive, and banking enterprises since that time.



ALBERT HERMON CASE

J. M. McDonald, of Vancouver and Seattle, has returned to the exploration staff of Granby Consolidated Mining, Smelting & Power Co., Ltd., after an absence of several years.

J. R. Wemlinger, New York mining engineer, is in Vancouver to investigate mining possibilities in the northwestern states and western Canada.

Robert G. McCuish has been elected president of Hedley Mascot Gold Mines, Ltd. Other new officers include **W. S. Charlton**, vice president; **V. J. Creeden**, general manager; and **William Paterson**, secretary-treasurer.

Paul E. Clarke, who relinquished the management of the Morning Star (G.M.A.) Mines, N. L., at Wood's Point, Victoria, to act as superintendent of tantalite mining operations in the Pilbara district, Western Australia, for the Commonwealth Government, has resumed the management of the Morning Star Mine.

A. A. McLeod, superintendent of Triton Gold Mines, N. L., Western Australia, until operations were suspended owing to the incidence of war conditions, and later in charge of the government exploratory work at Mt. Bischoff, Tasmania, is examining a large alluvial gold deposit for Gold Mines of Australia, Ltd.

W. H. Williams and L. R. Benjamin have been appointed to the Aluminum Industry Commission as representatives of Tasmania. Mr. Williams is director of mines in that State, and Mr. Benjamin superintendent of Australian Newsprint Mills, Pty., Ltd., near Hobart.

Lupo F. Cinco, of Manila, a representative of the office of the president of the Filipino government, who has served with the United States as well as the Filipino Bureau of Mines, made arrangements during the latter part of May to study mining methods and practices at the Eagle-Picher (MRC) Paxson operation, west of Baxter Springs. Following his tour of mining areas throughout the United States, he will return to the Philippines.

W. L. Merritt, former supervising engineer with the Metals Reserve Co. in Washington, has accepted a position with the United Zinc Smelting Corporation in the Tri-State district.

J. L. Nelson of Baxter Springs, for many years superintendent of the Vinegar Hill Zinc Co. and the Century Zinc Co. mining properties in the Tri-State, announced his retirement from an active mining career following his resignation, effective June 1, as superintendent of the Scott Mining Co.

Raymond Brooks is in Johannesburg, South Africa, where he is acting as manager for the South African Development Co., a subsidiary of Freeport Sulphur Co., in development work in Africa.

James W. Van Evera, Jr., recently with Pickands, Mather & Co., is now with the Interstate Iron Co. at Virginia, Minn.

H. W. Franz, having resigned from the staff of Chile Exploration Co. at Chuquicamata, Chile, is now with the foreign department of Union Carbide & Carbon Corporation.

Raymond C. Fleming has become senior mining engineer at the Vulcan mine of the Keiser Co., Box 82, Kelso, Calif.

Menahem Merlub-Sobel has resigned the post of director of research for Virginia-Carolina Chemical Corporation, and has become technical manager of Palestine Potash, Ltd., with mines at Kalia and Sodom and headquarters at Jerusalem, Palestine.

J. W. Maxwell, who was with the Mexican smelting department of American Smelting & Refining Co. for 25 years and assistant general manager for the last 15 years, has resigned to assume the post of commodity marketing specialist for Metals-Reserve Co. in Washington, D. C.

Frederick W. Leon recently resigned from the staff of Braden Copper Co., in Chile, and has gone to Ecuador to become smelter foreman with Coto-

paxi Exploration Co. He may be addressed at Casilla 272, Latacunga, Ecuador.

Harry Jomini has become senior plant engineer for Aluminum Company of Canada at the company's Wakefield magnesium plant.

Owen W. Ellis, recently with the engineering and metallurgical department of the Ontario Research Foundation, has been elected chairman of the Metallurgy Division of the Canadian Institute of Mining and Metallurgy.

Dr. Heinrich Ries, professor emeritus of geology at Cornell University, received the honorary doctor of science degree at Alfred University's recent commencement exercises. The degree was conferred "In recognition of a lifetime of devoted service in writing, teaching, and organization and research in the twin fields of ceramics and geology."

OBITUARIES

James Graves Scrugham, United States Senator from Nevada, former Governor of Nevada and Representative of that State in the House of Representatives, died in San Diego Naval Hospital on June 23 at the age of 65. He had also served as Nevada State Engineer and Public Service Commissioner. Throughout his career Senator Scrugham was a stout proponent of the interests of the mining West.

R. C. Hueston, 94, died on May 20 in Prescott, Ariz. He is credited with locating the Iron King mine, near Humboldt, which today is one of the large producers of lead-zinc ores.

Tindall Evans, 74, died in Phoenix, Ariz., on May 30. Mr. Evans was associated with the Cananea Consolidated Copper Co. at Cananea, Sonora, Mexico, as president and general manager for 22 years.

Roy Edwin Howe, 67, long-time mining engineer for the Cananea-Consolidated Copper Co. of Cananea, Sonora, Mexico, died on May 30 at the Copper Queen Hospital in Bisbee.

James L. Luke, treasurer of Cleveland-Cliffs Iron Co., died recently in Washington, D. C., from asphyxiation before he could be rescued from a burning dwelling. His home was in Cleveland, Ohio. During the war period he has been engaged in special work for the government.

W. L. Cumings, Sr., chief geologist of Bethlehem Steel, formerly active in the Lake Superior country, and associated with the Oliver Iron Mining Co., died on May 15 in Bethlehem, Pa.

Joseph B. Lower, long identified with mining in the Orient, died at Columbia City, Ind., on June 3, at the age of 67. He went to Korea with a group of young mining men in 1901, to work on an American concession, the Oriental Consolidated Mining Co. By 1918 he had become mine superintendent. In 1926 he was appointed assistant general manager and in 1931 general manager. In 1939 the Nippon Mining Co. bought the concession for $8,250,000.

W. F. Morgan, dean of the Upper Lake ore dock agents and retired veteran agent for the Lake Superior and Ishpeming R. R. at Marquette, Mich., died May 5.

Edmund Lionel Gay-Roberts, mining engineer, and lately consultant to Bushtick Mines, Ltd., in Southern Rhodesia, died recently in that country at the age of 63.

Alfred Ernest O'Flaherty, at one time chairman of Witwatersrand Deep, and former Editor of the *South African Mining and Engineering Journal*, died on March 31 last in the Eastern Transvaal, at the age of 76.

James A. (Jim) Thomas, 63 assistant superintendent of the United States mine of U. S. Smelting & Refining Co. since 1937, died on May 23 at Bingham, Utah.

Richard S. McCaffery, former New York consulting mining engineer, and University of Wisconsin professor of mining and metallurgy from 1914 to 1941, died in New York on June 12, at the age of 71. He was graduated from Columbia School of Mines in 1896 and had extensive experience in many mining regions before becoming a teacher at the university.

Walter B. Macaulay, who for the past 35 years had been chief engineer of the Yuba Manufacturing Co., San Francisco, died June 9 at his home in Oakland, Calif.

Verne F. Curtis, assistant chief engineer of International Minerals & Chemical Corporation, died on April 25 at his home in Evanston, Ill. He was 46.

Edward J. Merrett, 36, mine superintendent for Sherritt Gordon Mines, Ltd., died at Sherridon, Manitoba, on May 12.

Charles Hardy, president of Charles Hardy, Inc., and of Hardy Metallurgical Co., New York, died at his home, 30 Sutton Place, New York City, on June 8, at the age of 65. Mr. Hardy was a pioneer in powder metallurgy and an authority on tungsten, molybdenum, chromium, and manganese. He was a member of the A.I.M.E. and of many other technical societies.

A. R. Thomson, Southern Rhodesian mining pioneer, a past president of the Rhodesian Chamber of Mines, and a director of Wankie Colliery Co., died recently in South Africa at the age of 77.

Dr. Florence Bascom, a geologist who served with the U. S. Geological Survey from 1896 to 1936, who was associate editor of the *American Geologist* from 1896 to 1905 and an authority in her field, died at Williamstown, Mass., on June 18 at the age of 82.

LETTERS

Danger in Issue of "Substitute Money"

The Editor:

Truly, as you state in the April issue of the *Journal*, it is time to sit up and take notice when the Chairman of the Federal Reserve Board states that the United States is "the only country left that still has the archaic idea of maintaining a gold reserve back of our currency." Also that "the ratio of gold stocks to the volume of currency and credit simply does not mean anything any more."

It is now well over a hundred years since David Ricardo had the following to say: "Experience, however, shows that neither a state nor a bank ever has had the unrestricted power of issuing paper money, without abusing that power. In all states, therefore, the issue of paper money ought to be under some check and control, and none seems so proper for that purpose as that of subjecting the issuers of paper money to the obligation of paying their notes, either in gold coin or bullion."

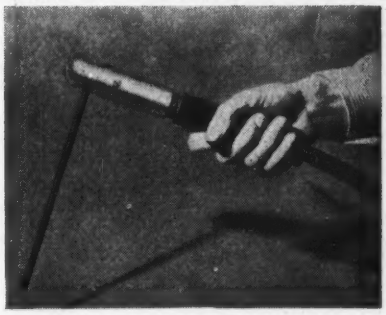
This role of checking the issuance of unwarranted quantities of paper money is perhaps the most valuable single function of the precious metals in any monetary system that uses paper. One may wonder if the Chairman of the Federal Reserve Board has already forgotten Russian rubles and German marks during the aftermath of the first World War. And it is well to realize that the threat of printing-press money is nowhere greater than under a representative form of government where, in the face of a deficit, a Congress may avoid the necessity of imposing odious taxes—and endangering votes—by the very simple expedient of issuing more greenbacks.

Without citing further evidence, and the supply has been scarcely touched here, it should be clear that we cannot afford to be without a sufficient supply of the precious metals to support our paper issues. Moreover, instead of disregarding a relative shrinkage between our metallic reserves and our paper, we should strive to put our monetary house in such order that we may again print on our paper that so many grains of gold or silver will be paid "to the bearer on demand." To issue paper, or "substitute" money, without the check of an obligation is to take the bridle off an unruly horse that may surely be expected to run away.

CHARLES A. PORTER.

Philadelphia, Pa.

EQUIPMENT NEWS

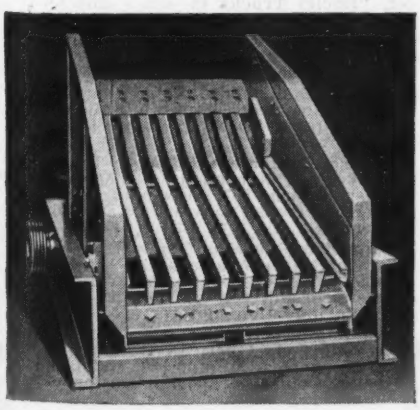


Insulated Electrode Holder

A new armor-clad, screw type, insulated electrode holder is announced by General Electric Co., Schenectady, N. Y. As illustrated, the head of the holder is completely enclosed in a sheath of aluminum armor, which protects the insulation, resists weld spatter, and eliminates accidental contact with the welding circuit. It is designed to hold electrodes up to and including ¼-in. in diameter. In use the holder is light in weight, unusually cool in operation, and maintains uniform melting rate down to a stub end.

Vibrating Bar Grizzly

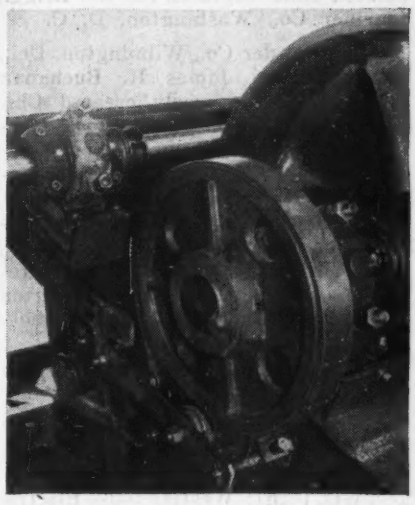
Useful for scalping service where clear spacing of 2½ in. or larger is permissible, the Symons vibrating bar grizzly is offered by Nordberg Process Machinery Co., New York, subsidiary of Nordberg Mfg. Co., Milwaukee, Wis. As illustrated, the bars are of heavy manganese steel, slightly diverging and tapered end to end and top and bottom. The shape and angle of inclination of the bars and the positive, powerful vibration assure a non-clogging scalping action that permits of big capacity even with wet, sticky materials. The grizzly is built



in one size, 42 in. wide with a clear lengthwise opening of 5 ft. It has ample capacity to be placed ahead of all sizes of secondary crushers.

Band-Type Back Stop

A shoe acting directly on the brake drum is one of the unique features of a new improved differential band-type

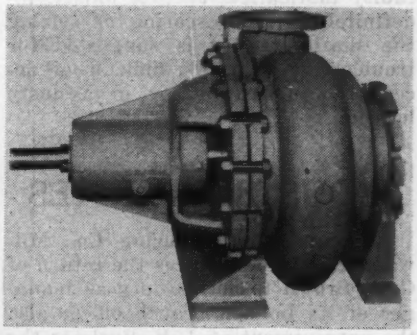


back stop announced by Barber-Greene Co., Aurora, Ill., for preventing belt conveyors or bucket elevators from running backwards due to load when the power is shut off. Instead of the brake band taking all the torque required to hold the conveyor, the shoe takes an appreciable part of the load. When the differential acts and the band tightens, the shoe is pulled up against the drum with great force, giving added friction. From 18 to 20 percent additional drum circumference is brought into contact through use of the shoe, and less frictional resistance of the brake band itself is required.

Trolley Safety Tap

For use with any type of portable equipment beyond the trolley line, Mosebach Electric & Supply Co., Pittsburgh 3, Pa., announces a new trolley safety tap. As illustrated, the assembly consists of a copper hook attached to a bronze fuse receptacle, and a

similar fuse receptacle at the opposite end of the barrel for attaching to cable connector. These assemblies are surrounded by an insulated tubular housing with fiber guard at hook end to protect against trolley wire. Taps are available in several styles.

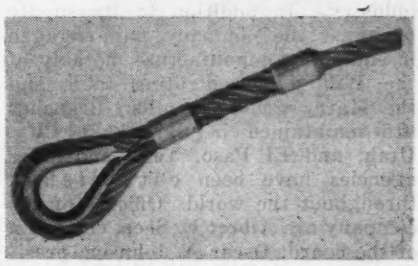


New Slurry Pump

Designed to handle sludge disposal in metal and non-metallic mining operations, Allis Chalmers Mfg. Co., Milwaukee 1, Wis., offers a new slurry pump made of a tough abrasive-resistant alloy. Simplified design permits removal of entire rotating elements without disturbing suction or discharge piping. The combination of alloy plus design is claimed to increase pump life two to four times over pumps made of ordinary materials. Efficiencies are comparable to those of ordinary clear-water pumps. Seven sizes are available to handle through 7,000 gpm.

Safety Splice for Wire-Rope Slings

Application of a new method for splicing wire rope into slings and other assemblies, as shown in the accompanying illustration, has been



developed by American Chain & Cable Co., Bridgeport, Conn. At present the splice can be applied only at the factory. Neater and more compact than hand-made splices, the new splice is flexible and develops 100 percent of the rope's strength. It will not unravel, and has no wire ends to injure workmen's hands. Any standard fitting may be used, re-used, or salvaged when the assembly is retired.

Bronze Bearing Metal

Sorel Steel Foundaries, Ltd., Montreal, Canada, announces that Sumet bronze bearing metal, hitherto re-

stricted to high-priority war use, is now available to industry in general. Sumet is a high-lead bronze incorporating processed lead minutely distributed throughout the virgin copper matrix. Although not offered as an oilless bearing, it will, in the event of faulty lubrication, operate almost indefinitely without scoring or seizing the shaft. Its use is suggested for troublesome bearings, difficult of access for lubrication, or in a dusty location.

INDUSTRIAL NOTES

Nordberg Manufacturing Co., Milwaukee, Wis., announces the return of **G. J. Brown** to active duty as manager of its London branch office; also the appointment of **J. P. Burls** to the position of Branch Manager in Johannesburg, in South Africa.

American Chain and Cable Co., Bridgeport, Conn., has recently announced that rope slings made by its two wire rope divisions—**American Cable Division** and **Hazard Wire Rope Division**, may now be accompanied by a certificate of test and register for the benefit of the user.

Pearson E. Neaman has been elected a vice president of **Freeport Sulphur Co.** and its subsidiaries, including **Cuban-American Manganese Corporation** and **Nicaro Nickel Co.**

John A. Roebling's Sons Co., Trenton, N. J., announces that **Ernest C. Low** has been named vice president in charge of sales; **John K. Thompson**, vice president in charge of production; and **Charles M. Jones**, vice president in charge of engineering.

Mine & Smelter Supply Co., Denver, Colo., is celebrating its 50th anniversary of service to the mining industry. In addition to its supply business, the company has engaged in equipment manufacture, notably of the Wilfley concentrating table and the Marcy grinding mills. Branches are maintained in Salt Lake City, Utah, and El Paso, Tex., and sales agencies have been established throughout the world. Officers of the company are **Albert E. Seep**, chairman of the board; **Oscar A. Johnson**, president; **Herman F. Seep**, vice president; **G. F. Olson**, secretary-treasurer; and **E. H. Hughes**, assistant secretary-treasurer.

Thomas Robins, Jr., has been elected president of **Robins Conveyors, Inc.**, succeeding **Thomas Matchett**, president since 1928.

Alfred Kauffmann, retired president of Link-Belt Co., has been elected a director of **Gardner-Denver Co.**, succeeding **P. H. Gardner**, resigned.

Francis R. MacNamara, Manila representative of the **Gardner-Denver Co.**, was among those liberated from Los Banos Internment Camp, south of Manila.

J. R. Van Fleet, president of **U. S. Vanadium Corporation**, a unit of Union Carbide and Carbon Corporation, has announced the formation of the **Metal Chemical Division** to manufacture and market compounds of tungsten, molybdenum, vanadium, and other metals. The new division will be in charge of **J. A. Holladay**, with headquarters at the corporation's New York office.

George S. Garrard has been appointed chief engineer for the **Briggs Clarifier Co.**, Washington, D. C.

Atlas Powder Co., Wilmington, Del., has appointed **James H. Buchanan** manager of the newly created Chicago district sales office. **J. E. Dedman, Jr.**, has been named export manager, with headquarters at Wilmington. The New York district sales office of the company's explosive department has been moved to 60 E. 42d St., New York City. The company's research headquarters at Wilmington are to be expanded at a cost of $400,000 for new laboratories.

Army-Navy "E" for excellence in production has been awarded to: **Aurora Pump Co.**, Aurora, Ill. (3d); **Macwhyte Co.**, Kenosha, Wis. (4th); **Nordberg Manufacturing Co.**, Milwaukee, Wis. (6th); **Westinghouse Electric Co.**, Baltimore, Md. (5th), Sunbury, Pa. (25th), Jersey City, N. J. (6th); **Electric Storage Battery Co.**, Philadelphia, Pa. (6th); **DeVilbiss Co.**, Toledo, Ohio (4th); **Babcock & Wilcox Co.**, Barberton, Ohio (6th); **American Steel & Wire Co.**, Cuyahoga works; **Gould Industrial Division**, National Battery Co., Depew, N. Y.; **J. K. Smit & Sons, Inc.**, New York.

BULLETINS

Gears. Foote Bros. Gear & Machine Corporation, Chicago 9, Ill., has just released an engineering bulletin on its "Aircraft Quality" gears.

Filters. Bull. No. 100 of General American Process Equipment, New York 17, N. Y., describes Conkey sludge filters.

Electrodes. Air Reduction Co., New York 17, N. Y., is distributing a new catalog of electrodes for welding various metals.

Arc Welding. General Electric Co., Schenectady, N. Y., has published an 8-page folder, "How to Repair Tractor Parts by Arc Welding."

Rubber Products. Manhattan Rubber Mfg. Division, Passaic, N. J., has printed the fifth edition of "Rubber Products for Industry."

Belt Vulcanizers. B. F. Goodrich Co., Akron, Ohio, has issued a 4-page catalog section describing portable electric belt vulcanizers for splicing and repair.

Storage Batteries. Philco Corporation, Storage Battery Division, Trenton, N. J., has published a complete summary of information on various industrial applications for storage batteries.

Belt Hooks. The Bristol Co., Waterbury 91, Conn., announces Bull. 737 describing a line of hinged-type wire belt hooks.

Refractories. Harbison-Walker Refractories Co., Pittsburgh 22, Pa., has published an elaborate folder in color giving data on five insulating bricks.

Speed Reducers. Philadelphia Gear Works, Philadelphia 34, Pa., is offering a 52-page catalog describing the entire line of self-contained motorized speed-reducing units.

Bulldozers. Baker Manufacturing Co., Springfield, Ill., has issued catalog No. 849 illustrating and describing its line of cable-controlled bulldozers.

Rubber Cement. B. F. Goodrich Co., Akron, Ohio, has published a bulletin on rubber cement and its suggested application to a variety of structural materials, including metals.

Diesel Power. Caterpillar Tractor Co., Peoria, Ill., has issued an 8-page folder on the application of diesel power at mines and mills.

Acid-Proof Cement. Quigley Co., New York 17, N. Y., is offering an 8-page illustrated folder on the use of acid-proof cements for masonry structures.

Welding. Metal Thermit Corporation, New York 5, N. Y., offers a bulletin in color describing thermit welding for fabrication and repair.

Haftraks. Linn Manufacturing Corporation, Morris, N. Y., has published an illustrated folder describing a variety of vehicles designed for off-the-highway operation, propelled through tracks in place of rear wheels.

Pumps. Fairbanks, Morse & Co., Chicago 5, Ill., has published Bull. AQB400.1 on oil-lubricated turbine pumps with inclosed impellers; and AQB500.1 on Niagara propeller pumps.

Friction Materials. Manhattan Rubber Manufacturing Division, Passaic, N. J., has released a catalog on friction materials for industrial machinery.

Manganese Steel. American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill., has published Bull. 1144-NM showing non-magnetic applications for Amsco manganese steel.

Turbines and Pumps. De Laval Steam Turbine Co., Trenton, N. J., has published Bull. 1181, describing its steam turbine helical gears, centrifugal, multiple-stage and Imo pumps, blowers and compressors, and flexible couplings.

Chain Belts. Chain Belt Co., Milwaukee, Wis., has published Bull. No. 460 on Z-metal chain belts.

Aluminum Ladders. Duo-Safety Ladder Corporation, Oshkosh, Wis., has announced a complete line of all-aluminum industrial ladders.

Grinding Mill Liners. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., is offering Bull. B6355, announcing a new A-C Lorain liner of lifters and plates in two separate units.

Diesel Power. Diesel Engine Manufacturers Assn., Chicago 2, Ill., has published a bulletin, "The Story of the Diesel," written in non-technical language.

Tires. "How to Get the Most Service Out of Your Off-the-Road Tires" is the title of a 42-page booklet published by B. F. Goodrich Co., Akron, Ohio.

Washing Plants. Pioneer Engineering Works, Minneapolis 13, Minn., offers form No. 556 illustrating and describing various types of portable and stationary ore-washing plants.

Explosives. Atlas Powder Co., Wilmington 99, Del., has published in Spanish a new catalog of explosives and blasting supplies.

Trucks. Euclid Machinery Co., Cleveland 17, Ohio, has prepared a new booklet, "Euclid Trucks in Mines and Quarries."

Oils. Hood Refining Co., Greensburg, Pa., offers catalog 145 on its power, lubricating, and cutting oils.

Mining Equipment. Lake Shore Engineering Co., Iron Mountain, Mich., has issued catalog 450 on its complete line of mining machinery.

Mining Equipment. Pioneer Engineering Works, Minneapolis 13, Minn., has published form 557 describing crushers, feeders, screens, conveyors, and dehydrators.

Magnetic Reversing Starters. General Electric Co., Schenectady, N. Y., offers a 4-page folder on A-C magnetic reversing starters for full-voltage starting of squirrel-cage induction motors.

Welding Electrodes. Page Steel and Wire Division, American Chain & Cable Co., Bridgeport, Conn., has published a 36-page booklet on the application of its welding electrodes and gas welding rods.

Dryers. General American Process Corporation, New York 17, N. Y., has published Bull. 52 on the design and construction of Louisville rotary dryers; Bull. 53 on Louisville steam-tube rotary dryers; and Bull. 250 on General American drum dryers.

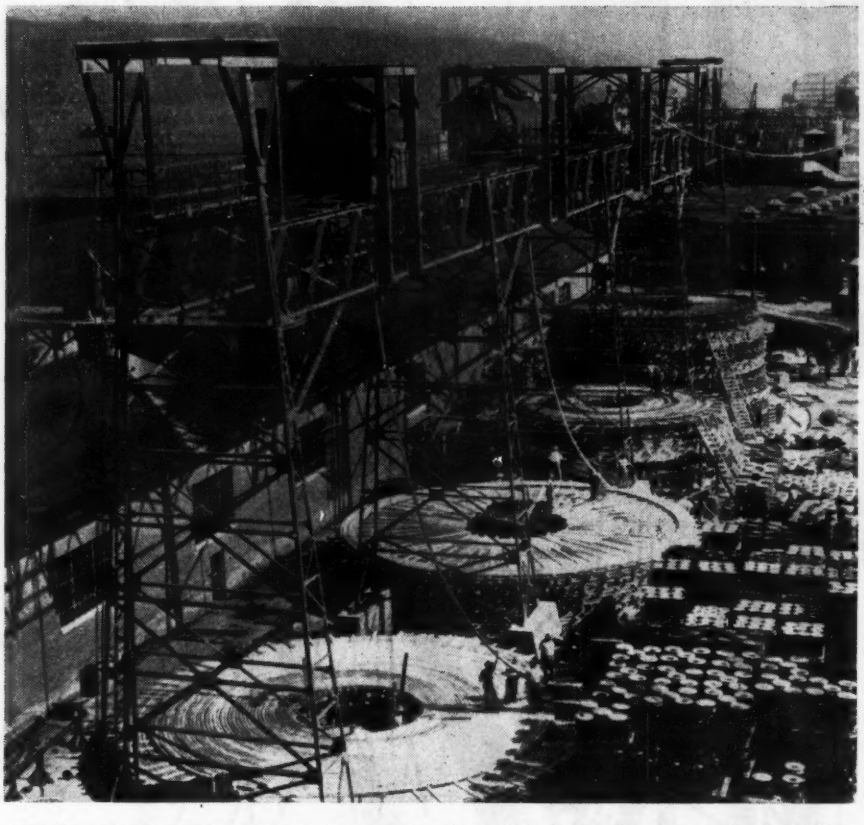
Preformed wire rope

SAVES REPLACEMENT 3 WAYS

Since preformed wire rope lasts longer, obviously it reduces frequency of replacing the rope itself. Not quite so obvious, but equally important, is the ease with which preformed wire rope adjusts itself to different uses. Because of its ready adaptability—its resistance to rotating in sheave grooves and its better spooling qualities—preformed postpones the replacement of machine parts or shut-downs for repairing. A third way in which preformed wire rope saves replacement is with the men on the job. As preformed rope is safer to handle it reduces lost-time accidents. Make certain your next wire rope is preformed.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

REGIONAL NEWS



COILING PLATFORMS at the Yonkers, N. Y., plant of Phelps Dodge Copper Products Corporation, where flexible pipe lines were made for laying under the English Channel to supply fuel to Allied armies in Europe. A continuous coil 50 ft. in diameter and 40 ft. high contained 40 miles, 4,000 tons, of pipe line, consisting of extruded lead pipe three inches in diameter, armored with 17 layers of steel, jute, and other protective covering. Filled with water to prevent crushing under its own weight, 110 miles of pipe line was paid into the holds of Liberty ships. Other companies making five-mile lengths of pipe line shipped to Yonkers for brazing together, were General Electric Co., Okonite-Callender Cable Co., and General Cable Co. The cable was laid from ships.

CALIFORNIA

Contact quicksilver mine is being reopened—U. S. Vanadium developing tungsten property at Pine Creek

★The old Contact Quicksilver mine, about a mile west of Pine Flat, Sonoma County, is being reopened under the name of Riley Contact mine, and early production is planned. Work currently in progress includes driving an 800-ft. tunnel for drainage, haulage, and ventilation purposes to reduce production costs. The property first produced in 1932 an in a superficial way continued through 1936, while operated by J. E. Grover. He subsequently sold the mine to H. G. Walker, who reported a small production from a Wyatt furnace in 1938. A rotary furnace was installed in 1940. H. G. Walker, superintendent, directs present operations.

★Western Metals Co., of San Francisco, has leased the Five Point mine, in Nine Mile Canyon, Kern County, from E. L. Bales, and plans early production of garnet. The company until recently operated maganese properties situated near Ruth, Trinity County.

★Fred Searls, Jr., president of Empire-Star Mines Co., Ltd., Grass Valley, Nevada County, in his annual report of stockholders, states the properties were worked at a net operating loss of $252,784 in 1944. High maintenance expenses, shortage of labor, and limited production continue to prevent profitable operations by gold mining companies established in the Grass Valley-Nevada City area. The Idaho Maryland Mines Corporation recently reported a 1944 operating loss of $127,269.

★P. P. Fredericks and A. H. Ferrin, of San Francisco, associated with C. Thomalson, of Oakland, have installed excavating and gravel-washing equipment driven by diesel power capable of handling some 1,000 yd. of gold-bearing material per 8-hr. shift at the old You Bet placers near Nevada City, Nevada County, formerly worked by hydraulic methods. A crew of seven men is employed.

★The moratorium bill, extending the provisions of the gold moratorium act to Oct. 1, 1947, after passing the Legislature has been signed by Governor Earl Warren. The bill protects gold-mining companies whose mines were closed under L-208 against cancellation of lease and non-fulfillment of contracts because of WPB action. The original bill, SB82 by Senator Jesse Mayo, was passed, but withdrawn because of a technical error, and was superseded by a bill introduced by Senator Thomas McCormack.

★Work is proceeding on the new 6,600-ft. tunnel driven under contract by the Morrison-Knutsen Construction Co. at the Pine Creek tungsten mine of U. S. Vanadium Coperation in Inyo County, and active underground development continues. The large concentrator, to which has recently been added a rotary calcining unit for scheelite nodulizing, is expected to be placed in operation again as soon as additional manpower becomes available, perhaps by Aug. 1. J. R. van Fleet is president of the corporation, and operations at Pine Creek are directed by M. N. Shaw, general superintendent.

★James O. Greenan, well-known Nevada mining engineer and mine operator, is reported to have optioned a group of talc claims in the Ubehebe district of Inyo County situated 54 miles northeast of Keeler, the nearest shipping point. Test work carried out by J. E. Atkinson, geologist and mining engineer, now directing work at the property, indicates presence of high-quality talc and deposits of steatite, in demand as a high-frequency radio-electric insulator. Mined output will be trucked to Keeler.

★The Non-ferrous Metals Commission has approved severance pay, shift premium pay, and collar-to-collar pay for employees of the Keystone Copper Corporation, Copperopolis. The union withdrew its demands for a closed shop and general wage increase of 17c an hour after the company had agreed on the items mentioned. Severance

pay of one week's wages after one year's service will be given on termination of employment through reduction of working force or suspension of operations. Extra pay for night work will be at the rate of 4c an hour for second shifts and 8c an hour for third shifts. Employees working on a two-shift basis will receive a differential of 6c an hour on the second shift. Collar-to-collar pay will amount to approximately one-half hour's pay each day.

★Geologic and topographic maps of manganese deposits in 20 counties in California have been released by the U. S. Geological Survey. They are on open file in the Survey's offices, Washington, D. C., and at the offices of the California Division of Mines, Ferry Bldg., San Francisco.

★According to word received from H. W. Orwig, manager, Owl Springs Co., construction of a plant for production of sintered manganese concentrate has been completed at the company's manganese property at Owl Springs, San Bernardino County. The mill has a capacity of 40 tons per day, and plant layout is such that enlargement can be effected at minimum cost. The crushing section is designed to handle 200 tons of material a day, and the sintering plant, containing a No. 2 Mace sintering hearth, has a capacity of 50 tons of concentrates a day. Mill investment and development done at the property during the past several years called for an outlay of nearly $80,000.

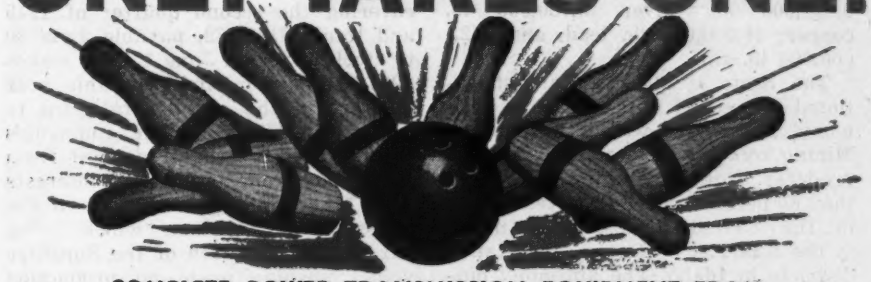
IDAHO

Lucky Friday opens new orebody —State was largest silver, tungsten, and antimony producer in 1944

★Bunker Hill & Sullivan mine output for 1944, according to the company's report, totaled 14,827 tons of lead, 922,716 oz. of silver, and 9,251 tons of zinc, compared with 1943 production of 23,325 tons of lead, 1,409,566 oz. silver, and 11,220 tons of zinc. The lowered production for last year is due entirely to the manpower shortage, and not to any lack of available ore. The company estimates the ore ready for mining at 2,778,539 tons, of which 2,181,339 tons is lead-silver-zinc ore and the remainder lead-silver.

★According to the U. S. Bureau of Mines, Idaho was again the largest silver producing State in the Union in 1944 and the largest lead and zinc producer among the Western states. The gold, silver, copper, lead, and zinc output of the State for 1944 is valued at $40,387,100. This total represents a 7 percent decline from the 1943 output because of labor shortage. Segregated production totals were 24,800 oz. gold,

ONLY TAKES ONE!



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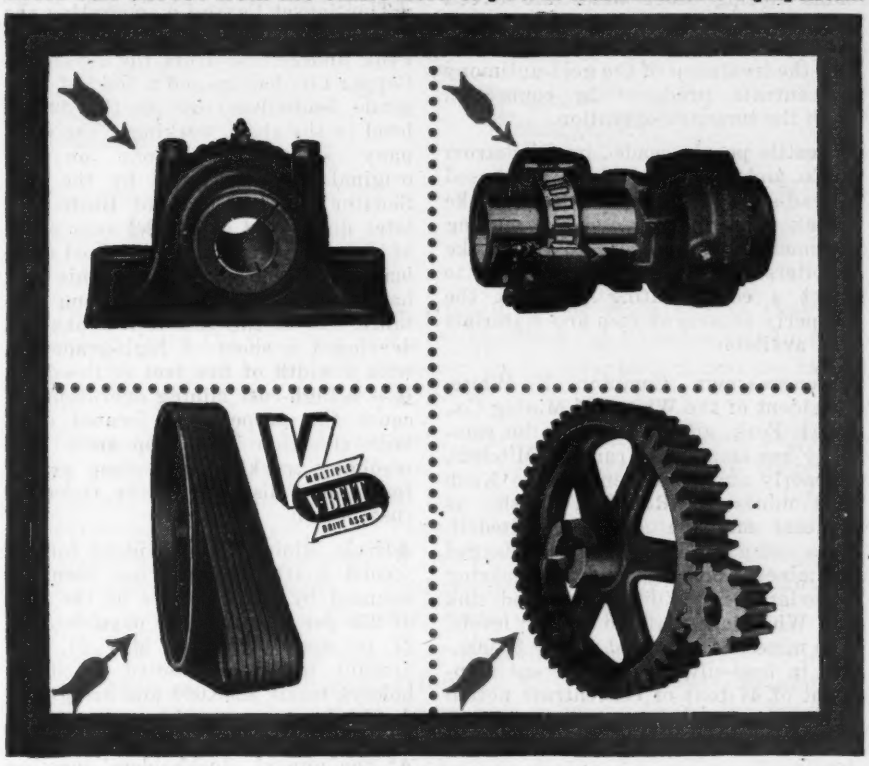
Let Medart's 60 years' engineering experience help you on your transmission problems. Recommendations are unbiased because Medart engineers can choose from the entire field of power transmission equipment.



"Patents make Jobs"

- Shaft Hangers
- Bicycle Type Sheaves
- V-Belt Drives
- Cast Iron Pulleys
- Steel Rim Pulleys
- Ring Oiling Bearings
- Wick Oiling Bearings
- Belt Tighteners
- Chain Drives
- Set Collars
- Hercules Pulleys
- Wood Pulleys
- Shafting
- Friction Clutches
- Sprockets
- Pattern Work
- Rigid Shaft Couplings
- Flexible Shaft Couplings
- Universal Shaft Couplings
- Medart-Timken-Bearings
- Iron & Semi-Steel Castings
- Wire Rope Sheaves
- Cut Tooth Gearing
- Molded Tooth Gearing

EQUIPMENT AND SPECIALIZED MACHINERY

MEDART

THE MEDART COMPANY

Idaho (*Continued*)

9,891,000 oz. silver, 3,750,000 lb. copper, 16,000,000 lb. lead, and 172,000,000 lb. zinc.

The State is also the largest national source of tungsten and antimony, in both of which the Bradley Mining company is the largest single producer. This company provides more than 50 percent of the tungsten output in the United States, from mines in the Stibnite, Patterson, and Hailey districts in Idaho. The antimony output is a byproduct accompanying the tungsten ore. Gold is also a byproduct of the Bradley company, and it was this source that produced most of the Idaho's gold output since the gold-mine closing order went into effect. The company has constructed a small experimental smelter unit at Stibnite for the treatment of the gold-antimony concentrate produced in connection with the tungsten operation.

★Seattle people headed by Sandstrom & Co. and R. L. Trout have purchased a lead-silver property on Rattlesnake Creek near Salmon, and are making shipments of crude ore to Salt Lake smelters. The company proposes to erect a concentrating plant at the property as soon as men and materials are available.

★Congressman Compton I. White, president of the Whitedelf Mining Co., Clark Fork, announces that the company has employed Frank H. Mitchell, formerly superintendent of the Knob Hill mines, at Republic, Wash., as general manager of the Whitedelf. This company has recently enlarged its mineral holdings and is preparing to enlarge its milling plant and sink the Whitedelf shaft to deeper levels. The mine has produced nearly $1,000,000 in lead-silver ore. A recent shipment of 47 tons of concentrate netted the company $7,789, averaging 41½ percent lead and 152 oz. silver per ton.

★The Silver Dollar Mining Co. is paying its "A" stockholders $30,000 as a partial return for money advanced the company through assessments. Two other similar payments have been made, each for $20,000. This company is part owner of a 400-ft. section in the Chester vein, operated through the Sunshine mine. Mill feed from this section of ground is averaging 65 oz. in silver per ton and 2½ percent lead. Mining is being done on the 3,100-ft. level, but the vein has been opened on the 3,700-ft. level, where it has been developed for about 300 ft. in the Silver Dollar area.

★The second quarterly dividend by the Federal Mining & Smelting Co. for 1945 is announced by the company's New York office at the rate of 75c a share, totaling $184,980, payable June 20. This brings the company's dividend payments this year to $369,960 and the total to date to $30,610,840.

★A dividend of 10c per share has been declared by the Sunshine Mining Co., covering the second quarter of 1945 and totals $148,882, payable June 30 to stock of record June 1. This makes $297,764 paid in dividends this year and brings the grand total paid to date to $24,833,535. The company's present profits are all derived from production from its different interests with other mining companies in the Chester vein system, which is a parallel fissure south of the Sunshine vein. Sunshine made no production from its own ore reserves either in 1944 or this year because of the manpower situation. The company has a crew of 100 men and could use at least 1,000.

★The Sunset Lease Co., operating the old W. A. Clark property on Sunset Peak under lease from the Anaconda Copper Co., has opened a body of high grade lead-silver ore on the 200-ft. level in the shaft workings. The company started operations on the original vein developed by the late Senator W. A. Clark, of Butte, but later discovered a parallel vein north of the workings, which contained more lead and less iron and zinc. This vein has been productive for a long distance, but in the last few weeks has developed a shoot of high-grade ore with a width of five feet in the drift. It is a high-cost mining operation because the property is located at a high elevation in a deep snow belt, involving trucking over steep grades for a long distance to the Golconda custom mill.

★Hecla Mining Co.'s dividend for the second quarter of 1945 has been announced by the directors at the rate of 25c per share and is payable June 21 to stock of record May 21. The amount to be distributed to stockholders totals $250,000 and brings the dividend payments this year to $500,000 and the grand total to $28,405,000. At the annual stockholders' meeting the company re-elected L. E. Hanley, Wallace, president and general manager; A. W. Witherspoon, Spokane, vice president; Leo J. Hoban, Wallace, secretary-treasurer, and Bert P. Woolridge, Wallace, assistant secretary-treasurer. Other directors elected to the board included Clarence Kipp and W. I. Barth, Milwaukee; Fred Searles, Jr., New York, and George F. Mayer.

★The Lucky Friday Silver-Lead Mining Co., at Mullan, has opened what appears to be a silver-lead-zinc orebody of major proportions at about 1,500 ft. depth from the surface. The Lucky Friday vein is in a geological structure in the Coeur d'Alene district that has not before been prospected. It is between what is locally known as the Osburn and White Ledge faults, which are parrellel and about 2,500 ft. apart. The vein system trends northeast-southwest, in directly the opposite course from the other producing mines of the district. The Lucky Friday company is equipped with electric haulage, electric pumps, air-operated mucking machine, two-ton hoisting skip and combination passenger cage, and an electric hoist equipped with automatic electric controls and capable of hoisting from a depth of 2,700 ft.

★The Silver Cable zinc-lead mine, east of Mullan, on the Montana side of the State line, which is under lease to the Hecla Mining Co., reports the discovery of a body of milling ore east of any previous mine workings. The Hecla company is shipping about 80 tons a day from this property to the Hecla mill at Gem. This is the third production year from the lease.

★The annual report of the Golconda Mining Co. shows a net profit of $7,847.34 after depletion, depreciation, and tax deductions. The company has closed its own Golconda mining operation because of a combination of low-grade ore and labor shortage, but is engaged in a custom milling operation, treating ores from the district.

★The Coeur d'Alene mining district shows an assessable net profit ore production for 1944 of $6,679,751, according to sworn statements filed by the different companies with W. H. Herrick, Shoshone County assessor and tax collector. The ore mined during the year totaled 1,538,867 tons, representing a reduction of 281,289 tons below the production record of 1943, due entirely to a shortage of labor. Outstanding feature of the year was the addition of seven new producing mines: Sidney, Daylight Lease, Douglas, Denver Development, Lynch-Pine Creek, Silver Syndicate, and Lucky Friday. All are zinc-lead producers with the exception of the last two, which are silver-lead mines. Royalty payments also figured for the first time in the output of the Coeur d'Alene district, amounting to $55,319.

★The New Wilbert mine, near Arco, has made its first shipment of 50 tons of lead-silver ore to a Salt Lake smelter. C. A. Dye, formerly of Salmon, is in charge of the development and states that production is being made from an 8-ft. vein of shipping ore.

★The Sunset Lease, north of Wallace, has opened a vein of lead-silver ore 5 ft. wide, which carries 32 percent lead, 22 per cent zinc, and 23 oz. of silver per ton. This is the highest-grade ore ever found on the property. The leasing company has been producing for the last two years principally from a vein carrying zinc with small lead and silver values combined with a heavy iron content. The new vein is a parallel fissure and has been opened on the 200-ft. shaft level. The Sunset property was originally purchased by the late Senator W. A. Clark, of Butte. Later the property was acquired by the Anaconda Copper Mining Co., the present owners, in a deal involving the Clark holdings in Butte.

WASHINGTON

Agreement reached in government's suit against Northwest Magnesite—Contract to drill iron deposits

★E. G. Garber, vice president and manager, Northwest Magnesite Co., Chewelah, states that reduction of tariffs under reciprocal trade agreements may force the plant to close, as in 1922 and 1923 immediately after the first World War. C. E. Marr, president, Northwest Mining Association, has been instrumental in forwarding from members of the association letters to congressmen protesting against reciprocal trade agreements, which mining men declare would greatly endanger mining operations in the Northwest.

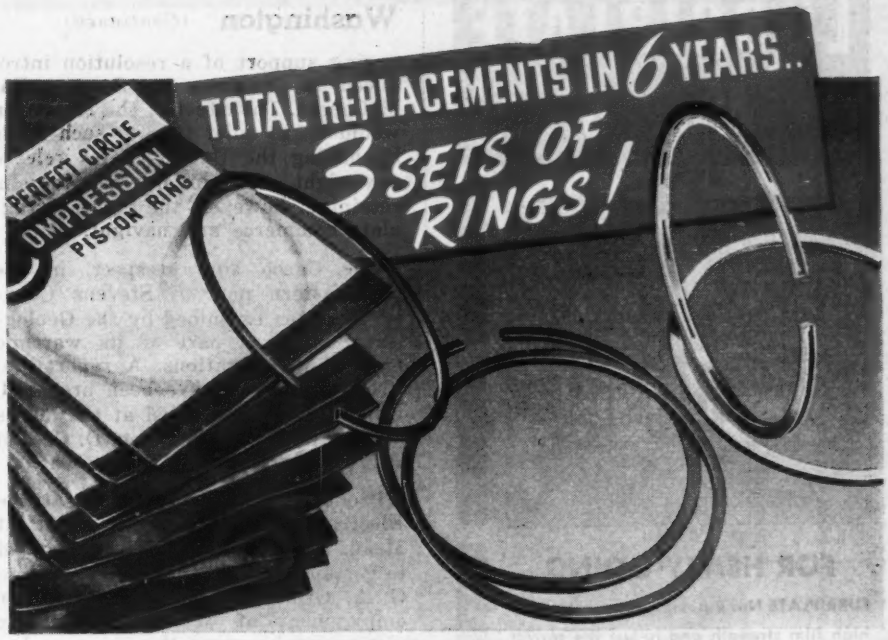
★The State Supreme Court has heard the case of R. P. Jetty and L. H. House against the Jett Ross Mines Co., and has granted judgment in favor of the company for a balance of $2,000 due on the purchase price of a dragline.

★An agreement between attorneys has postponed the action of the government against Northwest Magnesite Co., in which the government claimed the land of five Indian wards has been damaged by dust from the company's plant at Chewelah.

★Vivian Brothers, of Kellogg, Idaho, have been given a contract to diamond-drill iron deposits on Buckhorn Mountains, in northeastern Okanogan County, according to P. E. Oscarson, head of the U. S. Bureau of Mines office in Spokane. The drilling crew arrived June 1. Several owners are interested in the properties, including the Magnetite Mining Co. The properties are reached from Curlew, a station on the Great Northern R. R.

★The recent visit of Walter Lyman Brown, of San Francisco, to Spokane, the Metaline district, and northern Stevens County, aroused much interest, for he is the head of the Willow Creek Mines Co., owners of the Van-Stone mine, on Onion Creek, 21 miles northeast of Colville. This zinc property is one of the most important and best-developed in Stevens County, and has attracted the attention of several large mining corporations looking to the possibilities of zinc production in this part of the State. Additional equipment has been shipped from California to the mine, managed by John Kingman.

★On the ground that the states own the beds of all tidewaters up to the line of high tide lying within their jurisdiction, and the beds of navigable lakes up to high-water mark, with consequent ownership of mineral deposits therein, the West Coast Mineral Association, of Seattle, is



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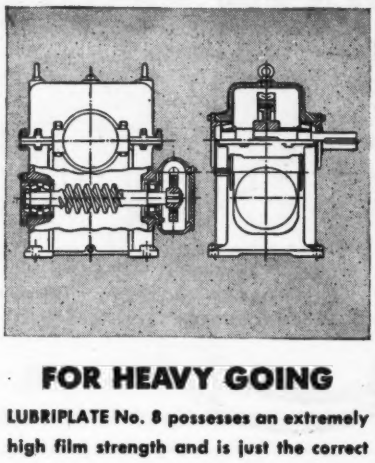

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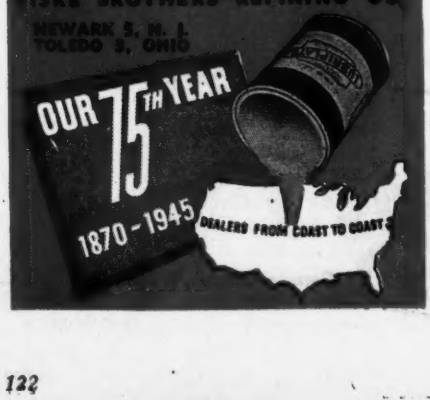

Washington (*Continued*)

urging support of a resolution introduced in Congress by Senator Pat McCarran. The effect of the resolution would be to quiet title to such lands by having the United States release any right, title, or interest therein, retaining, however, the right to regulate commerce and navigation.

★The Carbo zinc prospect, in the northeastern part of Stevens County, has been examined by the Geological Survey as part of its wartime mineral investigations. A report and two illustrations have been prepared, which may be inspected at the offices of the Survey, Washington, D. C., and 707 Peyton Bldg., Spokane, Wash.

★Production of sodium metal at the Electro-Metallurgical Co.'s plant at Mead, north of Spokane, is scheduled to get under way at once, according to G. A. Griffin. Present plans call for employment of 350 men. A labor settlement has been in progress between the employees and the Spokane Metal Trades Council, AFL.

On the other side of the State, at Vancouver, managerial and other office workers kept two pot lines functioning at the Vancouver plant of Alcoa during a strike which closed three pot lines. The A. F. of L. Trades Council at Vancouver said seven craft unions remained on the job during the strike, which was unauthorized.

★President H. Louis Schermerhorn reports that Metaline Mining & Leasing Co. made operating profits in 1944 of $114,107 compared to $20,187 for 1943. Net profits after deductions for administrative and general expenses and for depreciation and depletion were $49,818, compared with $39,900 in 1943. During the year the company mined 49,486 tons of milling ore, producing therefrom 3,506 tons of zinc concentrates and 1,484 tons of lead concentrates. Underground work done during 1944 included 2,620 ft. of drifting and raising, and 16,523 ft. of diamond drilling. Surface diamond-drill work done by the U. S. Bureau of Mines revealed 440,000 tons of ore with a combined grade of 7 percent lead and zinc. Development work was greatly restricted by manpower shortage.

OREGON

State authority reports bauxite of high grade near Salem—Bureau of Mines Albany division enlarged

★The Albany Division of the U. S. Bureau of Mines has been reorganized and enlarged to include what has been the Spokane Division. S. H. Lorain, who has been the Bureau's representative at Moscow, Idaho, has been made chief of the Albany Division, which will comprise the states of Oregon, Washington, Idaho, and Montana. Headquarters at Albany will be at the recently established Northwestern Electro-Development Laboratory. All field investigations and exploratory operations of the division will report direct to the chief at Washington D. C. Metallurgical laboratory investigations will operate under a parallel organization in charge of B. A. Rogers at Albany. Field investigations will be conducted by P. E. Oscarson, Spokane, and E. A. Newman, Helena, Montana. Mr. Oscarson will have charge of the Bureau work in eastern Washington, eastern Oregon, and northern Idaho, reports being made to the Albany office. Western Oregon and western Washington work will be handled directly from the Albany office.

★High-grade bauxite suitable for alumina production found north and south of Salem contains from 50 to 60 percent alumina, 1 to 13 percent iron, and 2 to 6 percent silica, according to the State Department of Mineral Industries. Some of the low-grade deposits contain 35 percent alumina, 20 percent iron, and 10 percent silica. The department expects to continue investigations to decide if the deposits have commercial value.

UTAH

Army recalls soldiers furloughed to mines—Hearings develop opposition to public land withdrawals

★Abrupt losses of vitally needed manpower followed announcement on June 2 by Ninth Service Command headquarters, U. S. Army Service Forces, Fort Douglas, Utah, recalling all enlisted reservists from metal mines. Army officials said about 1,900 reservists in all were being recalled from metal mines in Utah, Idaho, Nevada, Montana, California, Oregon, Washington, and Arizona. Although the youngest men were to be taken first, and the recall was spread out over a period ending Nov. 1, the reservists themselves did not interpret the call this way at many mines. Instead, groups of reservists en masse left their mining jobs and reported to Army posts. Reservists under 26 had been recalled into the Army previously, and now those between 26 and 38 were to be taken. Protests of the Utah production urgency committee and State War Manpower Commission resulted in modification of the order, so that only reservists under 30 are recalled.

A. G. Mackenzie, manager, Utah Metal Mine Operators Association, said 406 soldiers had been released to Utah metal mines during August and September 1943. Of these men, 113 still were employed by the mines as of January 1945, he said, pointing out,

wever, that many are in critical oduction work which cannot easily taken over by other men. Joseph S. ayer, Utah WMC director, said portunities to replace skilled work- are practically non-existent. He inted out that lead is classified na- nally as "No. 1 critical." Only veral days before he had pointed the ed for 300 additional lead miners Utah. One prominent lead-zinc pro- cer, who asked that his name not used, said it looked to him as ough the Army, in recalling miners om already dangerously depleted rking forces, was disregarding war oduction appeals for more lead pro- ction and ignoring importance of ntinuous operation of mines both om the standpoint of maintenance d employment in the transition and stwar periods. Permanent shut- wns may follow the recall of the servists if further tariff reductions foreign metals should ensue, he id.

U. S. Interior Department policies withdrawing 3,000,000 acres of nd, (later reduced to 200,000 acres mbracing the known mineral salt eds) in southeastern Utah were sailed at a public hearing conducted Senators Pat McCarran, Nevada; be Murdock, Utah; and E. V. Robert- n, Wyoming, in Salt Lake City, May -29. Witnesses charged that the De- rtment had ignored or circumvented ws it did not like in making the ithdrawal and in acting on applica- ons for patents and leases. Conflict- g claims had developed, it was own, involving two land withdraw- s, changes in the laws and rulings the General Land Office, interpreta- ons of the old placer mining law and bsequent leasing act, and efforts to velop the magnesium deposit at the art of the war. Governor Herbert B. aw emphasized the importance of blic land policies in a state whose ea is largely controlled by the ederal Government. Tom Lyon, eologist, said he felt the Department equently had overstepped its legal uthority and something should be one to put a stop to the practice, ther by legislation or agreement.

The morning session of the second ay's hearing developed into a dis- ssion over legality of specific land ithdrawals, and the entire policy of nd withdrawals. J. D. Wolfson, ssistant U. S. Land Commissioner, efended the Department's position. nder questioning by three senators mposing the subcommittee conduct- g the hearing, Mr. Wolfson testified at the 200,000-acre withdrawal in rand County was made in connection ith pending legislation—the so-called ill Bill—which provides for govern- ent rather than private development potash developments. "If this bill defeated will the withdrawal be voked?" Senator Murdock asked. r. Wolfson replied that in his opinion would be revoked if the bill is de- ated, but that it will not be revoked

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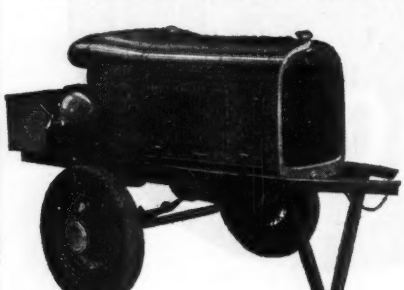

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Utah (*continued*)

if the bill is enacted. Senator Robertson than asked if the government would proceed to develop the area if the bill is enacted. "If it is passed in its present form," Mr. Wolfson answered, "I think it would place that obligation upon the government." Senator McCarran then remarked that he was opposed to the government's developing resources which private industry is willing, able, and ready to develop.

★Development work at the Park Standard mine, in the East Park City district, is being continued by A. F. Dunyon, recently appointed superintendent. Mrs. Lillian Dunyon, widow of N. A. Dunyon, who directed development work at the mine for many years, has succeeded her husband as president and general manager. Installation of modern equipment is planned, says a report to stockholders. E. D. Sheets, of Salt Lake City, is secretary.

★Postwar demand for copper will be ample to insure continued employment of some 4,100 men now working at Utah Copper Co.'s mine and concentrators for at least several years after V-J day, E. T. Stannard, president of Kennecott Copper Corporation, said June 2 in Salt Lake City. Mr. Stannard visited the Utah and Nevada properties controlled by Kenecott. A modest rise in the price of copper is probable after the war when free supply and demand are resumed, he said. Production of Kennecott 'controlled companies in the United States for 1945 so far is about 72 percent of the rate maintained early in 1944. Postwar plans for Utah Copper include installation of two more turbine units and additional boiler equipment in the new power plant at Magna. Cost of the entire project will be about $2,500,000, according to Mr. Stannard.

★Thirty of the more than 1,600 employees at the Utah Copper Co.'s open-pit mine at Bingham will receive night-shift premium pay of 6c an hour, according to ruling announced June 3 by the Non-Ferrous Metals Commission of WLB. The issue involved whether the work of three crews on the night line car, night bulldozer, and night machine shop should receive 4c an hour premium as "second shift" workers, or 6c an hour as "intermediate" shift workers.

ARIZONA

Non-Ferrous Metals Commission settles dispute between union and operators at Miami and Inspiration

★The Arizona Supreme Court has set aside the partial-disability award of the Arizona Industrial Commission to Castulo G. Garcia, injured in Kennecott Copper Corporation's m at Ray. The court held that the e dence tended to show Garcia was titled to total and permanent ability.

★W. F. Pritchett, of Walker, purchased the Poland group of min claims in Yavapai County. M values are in gold, silver, copper, lead.

★L. A. Paxton and J. Miles h leased the old Wilson mining pr erty in Vicksburg. They plan to habiliate the mine and start produc copper ore in the near future.

★Copper and molybdenum conc trates are being produced at Squaw Peaks mine, five miles south Camp Verde. Edison Thacker is sup intendent of operations.

★W. L. Turner, formerly with ore-buying department of Anacon has started mining operations on Cave Creek property, in Cave Can west of Bisbee. Values of the m are in lead, zinc, copper, and silv E. C. Widby and J. L. Harper associated with Mr. Turner.

★The Non-Ferrous Metals Commissi has granted extra pay for night shi to the employees of the Miami Cop Co. and the Castle Dome Copper C both of Miami, and to the Eag Picher Mining & Smelting Co., Tucs The Miami miners were denied increase of 25c an hour, but the co mission granted them extra pay four cents an hour for second shi six cents an hour for intermedia shifts, and eight cents for third shi all retroactive to Nov. 24, 1944 Th were also granted a vacation of o week with six days' pay one yea service, and two weeks with twe days' pay after five years' servi with a reduction of five days after o year and ten days after five yea service in the event the companies turn to a five-day week. A simil concession was made in the Eag Picher case, in which any gene wage increase was deferred for days while the management and t union attempt to work out asser intraplant wage inequities. Ret active pay was ordered to March 1945, date of certification of the c to the the NWLB.

★General wage increases of from 9 to $1.49 a shift have been denied m than 800 employees of the Inspirati Consolidated Copper Co. and the Inte national Smelting & Refining Co., I spiration, by the Non-Ferrous Meta Commission. Thirteen issues were d cided by the commission in settli a dispute between the companies a the International Union of Mine, M and Smelter Workers, CIO, bargai ing agent for the employees. A opening clause was ordered in the co tracts between the companies and t union, providing that in the event a change in the national wage stabi zation policy, during the life of t

contract, either party may, upon 30 days' written notice to the other, open the contract as to the general wage scale. Extra pay for night work was awarded of four cents an hour on second shifts, six cents an hour on intermediate shifts, and eight cents an hour on third shifts. The union's request for a guaranteed annual wage was denied, but a resolution by the commission was forwarded to the Nation War Labor Board suggesting that the non-ferrous industry be included in the President's study of guaranteed annual wage plans. The issue of severance pay was referred back to the companies and the union for collective bargaining.

★The Emma claim, in the Walker district, is under development by A. V. Irvin and Roscoe Pike, who have installed mechanical equipment and expect to ship one car a month of gold-silver-lead ore.

★Three quicksilver properties are being operated at Sunflower—the Arizona Quick, the Ord, and the Mideo. The last was closed during the past winter, but is now recruiting a working force to mine and furnace its ore.

★The Mountain Springs property, in the Eureka mining district, Yavapai County, has been leased by Charles Craig and associates of Long Beach, Calif. The mine was part of the Lawler estate and is near the Copper King, Bagdad, and other properties in that area.

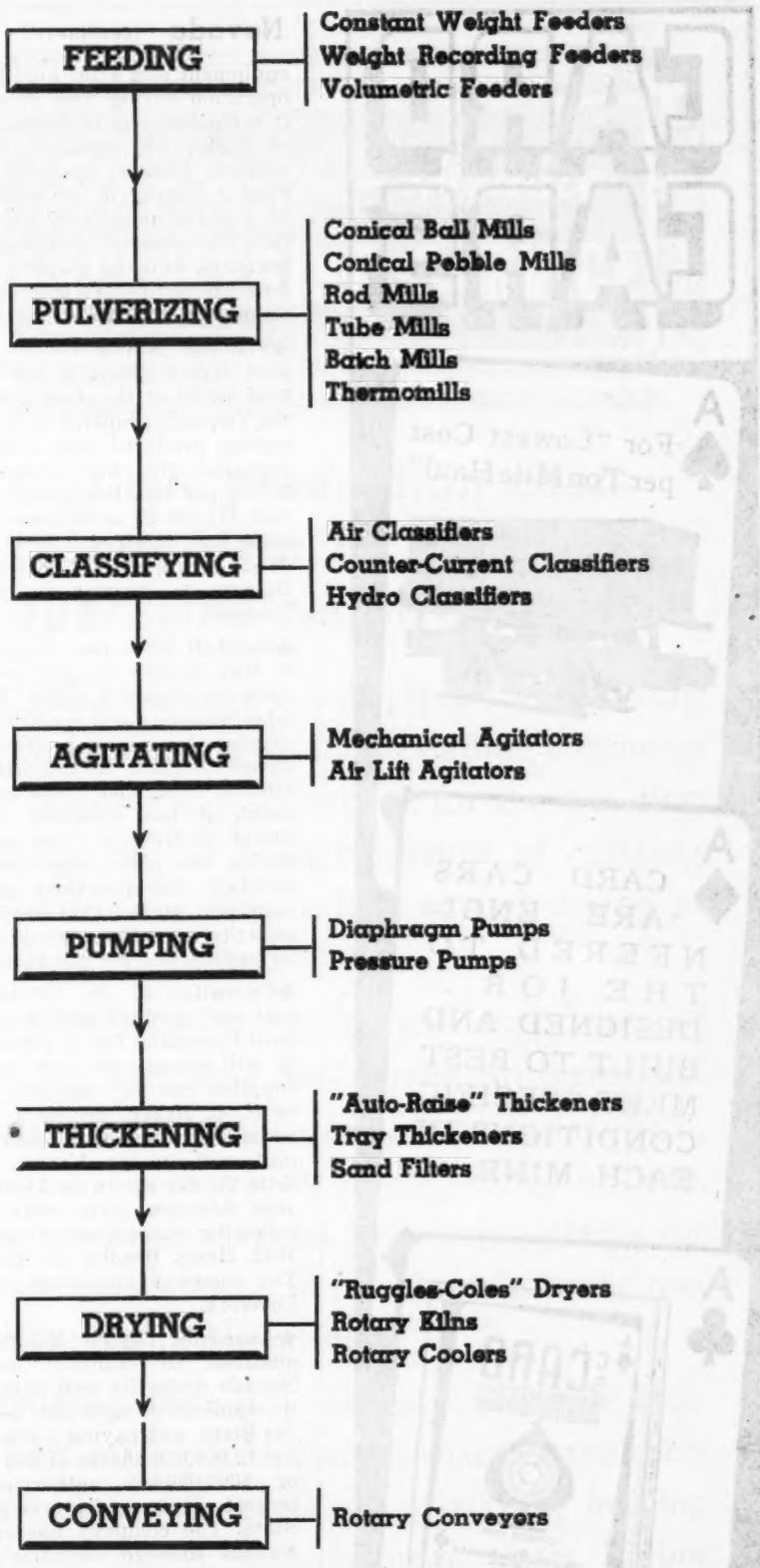
★The Venus mine, near Kirkland, is under development by Mark Gemmill, who has installed a diesel compressor and hoist. A new shaft will be sunk to tap old workings at a depth of 115 ft. Gold and copper ore will be produced.

NEVADA

Getchell sinks new three-compartment shaft—Drilling resumed at Lone Mountain—Tungsten Metals closes

★Mountain City Copper Co., controlled and operated by Anaconda Copper Co., reports 1944 net profit of $142,946, after depreciation and federal taxes but before depletion, compared with 1943 net loss of $143,613, computed on the same basis. Production, curtailed by manpower shortage, was 6,006 tons of shipping ore, and 74,363 tons of milling ore containing 8,292,649 lb. copper. J. J. Lillie is manager of the company's Rio Tinto mine and 350-ton flotation plant at Rio Tinto, northern Elko County.

★The property of the Tungsten Metals Corporation, with scheelite mine and 100-ton concentrator at Shoshone, White Pine County, has been closed and



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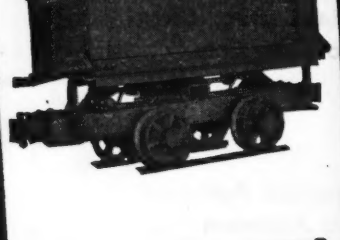

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Nevada (*continued*)

equipment sold after highly successful operation during nine years in which it ranked second in Nevada in output of high-grade tungsten concentrate, receipts having exceeded $3,000,000. Paul J. Sirkegian, of Kimberly, head of the company, and superintendent for Consolidated Coppermines Corporation, said the property still has a long productive life in prospect under normal operating conditions.

★Tonopah Mining Co. in its 43d annual report shows a net balance of $495,269.98 at the close of 1944. From the Tonopah property during the year lessees produced only 3,450 tons of shipping ore, with gross value of $25.91 per ton. Royalty from this ore was $12,545.22, a decrease of $13,236 from that received in 1943. Two dividends totaling $52,200 were paid. Horace A. Johnson is manager at Tonopah.

★Getchell Mine Inc., compelled early in May to close its gold property and 1,000-ton cyanide plant because of labor shortage and inability to obtain supplies, is sinking a deep three-compartment shaft in the wide zone of altered, silicified limestone, from which it has produced about one-fourth of Nevada's total gold output during the past seven years. N. H. Getchell, vice president and general manager, stated that resumption of capacity operation probably could not be undertaken for six months.

★Operation of the 700-ton cyanide mill and open-pit gold mine of Standard Cyaniding Co. in Pershing County will resume as soon as men and supplies can be obtained, according to H. L. Hazen, president. It will be necessary to replace a heavy-duty rod mill sold to the Nevada-Massachusetts Co. for use in its 1,000-ton tungsten flotation plant near Mill City following suspension of operation in 1942. Henry Bradley is vice president. The company maintains an office in Lovelock.

★Anaconda Copper Mining Co. has qualified to transact business in Nevada under its own name by filing its application with the Secretary of the State, and paying a fee of $12,350 for 12,000,000 shares of $50 par value, or $600,000,000 authorized capital, largest corporate fee ever paid to the State. The company has operated in Nevada through subsidiaries, including International Smelting & Refining Co., which operates Mountain City Copper Co., and Copper Canyon mine. It controls Basic Magnesium, Inc., but has been released by federal agencies from management of the DPC owned plants and mines of that concern.

★Drilling, halted in December by cold and snow, has been resumed by U. S. Smelting, Refining & Mining Co. on a zinc property at Lone Mountain, 18 miles west of Eureka. W. F. Walthall, of the Salt Lake City office, is in charge. The claims were acquired from Eureka miners formerly shippers of several carloads of ore.

★For the first quarter of 1945, Consolidated Coppermines Corporation reports a net income before depletion of $128,676.50, compared with a net of $17,689.72 for the first quarter of 1944. Cost of development this year was one-fourth of that in last year's first quarter. With a crew of 475 men, about 50 percent of the number normally employed, production is about 6,500 tons a day, as against 9,000 tons with a full crew. Mine output is shipped by rail to the Kennecott concentrator, at McGill. The Consolidated Coppermines property is at Kimberly, White Pine County, with C. I. Cook, manager, directing operations. P. J. Sirkegian is general superintendent.

★International Mining Corporation, of New York, operating the old Groom lead mine, in western Lincoln County, has devoted most of its activity to diamond drilling, having completed 1,819 ft. of holes, deepest 390 ft., at a cost of $6,024. The flotation mill remained closed, but development work continued, and 1,193 tons of ore was shipped to the smelter, containing 19.8 percent lead and 5.3 oz. silver per ton. New equipment added includes a compressor, motor trammer, scrapers, and accessories, with a diesel power unit to be installed shortly preparatory to resumption of milling operations. Dan Sheahan, of Reno, is superintendent. Drilling of the ground has been conducted by the U. S. Bureau of Mines, and a report on the district geology has been prepared by the State Mining Bureau.

★July production of Cordero Mining Co. from its quicksilver mine and 125-ton Herreshoff furnace plant is expected to reach or exceed 500 flasks of quicksilver, according to D. Ford McCormick, manager. The property is in northern Humbolt County, near McDermitt. Ore is now mined to a depth of more than 600 ft. Subsidiary of the Sun Oil Co. of Philadelphia, the company started mining by open-pit methods, and subsequent drilling revealed good furnace ore at depth. The property is one of the foremost quicksilver producers in the United States. S. H. Williston, vice president and treasurer, of Cordero, directs operations.

COLORADO

Minerals Reclamation Service acquiring extensive holdings—Progress in oil-shale project at Rifle

★American Smelting & Refining Co. is reported planning a flotation mill in the Kokomo district, which will concentrate ore on a custom basis as well

as from the company's Lucky Strike mine, where it has been doing extensive development work. Studies of the U. S. Geological Survey and Bureau of Mines indicate the presence of deeper ore zones than those now being worked, and diamond drilling is being carried on by the Bureau on the Kokomo-Kimberly property and by A. S. & R. on the Lucky Strike property, to establish the limits of these zones. They are in sedimentary deposits similar to those at Leadville.

★Minerals Reclamation Service of Colorado Springs announces acquisition of the School Section lease at Cripple Creek, and is negotiating for the Caledonia mine. It owns the Record mill, at Alma; is substantially interested in Record Mines, Inc., which owns several leases in the Alma district, and has bought controlling interest in the Alma Zinc Co., which has been developing and equipping the Walker mine, in Buckskin Gulch, with an RFC loan. Minerals Reclamation Service plans to liquidate this. MRS also owns the largest block of stock in Horseshoe Zinc Co., which is opening the Hilltop mine, and a substantial interest in North Alma Mines Co. In Cripple Creek MRS has bought the Robbins and the Palace buildings.

★A three-ton compressor borrowed from the Bureau of Mines' helium operations at Shiprock, N. M., has been transported overland to the site of the Bureau's new oil-shale mine at Rifle, so that preliminary mining operations may begin. The U. S. government is finding out just what handicaps are faced by the would-be operator of a new mine these days. Rifle is so crowded that housing accommodations will permit only a few of the Bureau staff to live there; manpower is almost nil, and the highest priorities are not sufficient for quick acquisition of machinery. However, the Grazing Service is completing an eight-mile $35,000 truck trail for preliminary construction from mine-site to plant-site; rights-of-way are being acquired; specifications for office and laboratory buildings have been completed; a power contract has been completed for Washington action; invitations to bid on the 1½-mile tramway from mine to mill will be issued as soon as profile and contour maps are prepared (and offers of used tramways will also be considered); and finally, a water system will be built as soon as rights-of-way are acquired.

★Earl Alexander, of Ouray, is "mining" an odd deposit—the talus left by a huge landslide slipping off the mountains on the east side of Ironton Park between Ouray and Silverton. Alexander's crews are cleaning up the talus with bulldozer and truck and transporting it to mill by means of a half-mile access road constructed to the highway last year. The claim, the "Lost Day," was located by Alexander's father, Jacob Alexander. Both

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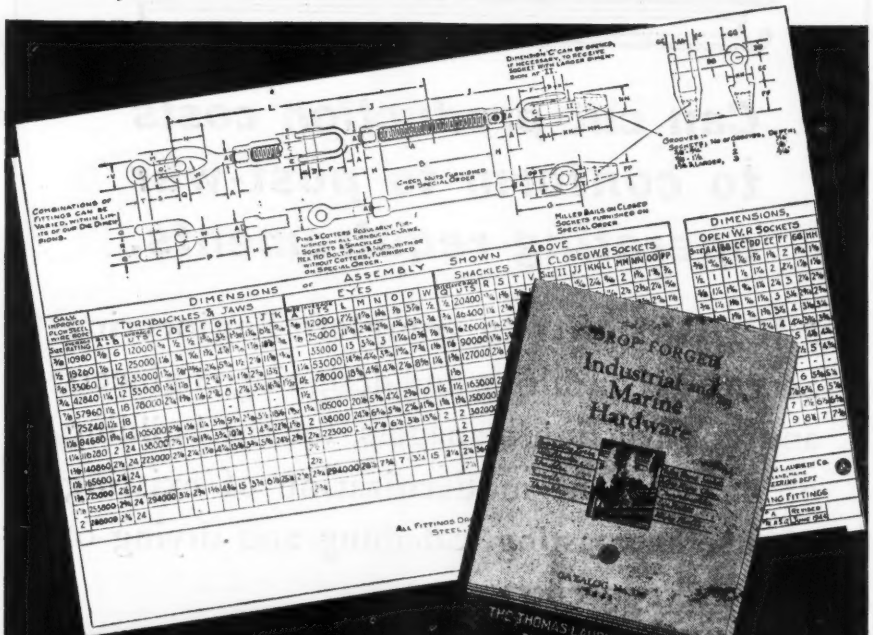

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LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

Colorado *(continued)*

father and son have held the theory that the original fissure vein from which the ore comes may be buried somewhere beneath the talus, and Earl Alexander thinks his operations may uncover it. The ore is predominately lead-bearing, with very little zinc.

★E. W. Creel and associates, of Ouray, have resumed shipping from the Mickey Breen mine, located up Poughkeepsie Gulch some five miles from Ouray. A snowslide last winter cut off access to the mine and prevented shipping until the snow melted this spring. In the meantime work crews were shifted to development work at the nearby Mountain Monarch mine. The Mickey Breen ore is a lead-zinc-copper complex.

ARKANSAS

Manganese and zinc production improving—Bureau of Mines continues drilling and geophysical work

★Harold B. Foxhall, a native of Memphis, Tenn., has recently been appointed to the position of State Geologist. Mr. Foxhall spent two years with the U. S. Geological Survey exploring for bauxite in Arkansas. Subsequently he was attached to the Military Geology Section of the U.S.G.S. in Washington, D. C. He received his B.A. degree in geology from the University of Texas and holds an M.A. degree from Stanford University. The office of State Geologist is one of seven agencies consolidated under an act of the 1945 Legislature, which created the Resources and Development Commission to reorganize and administer the State agencies relating to resources.

★Appreciable shipments of zinc concentrates are reportedly going out from the Hurricane mine and mill operated by the Grimmett Construction Co. near the Big Hurricane Cavern, in the northwest Searcy County. Seven carloads of concentrates have recently been shipped from Pindall. Last year a modern gravity mill was installed at the mine, but operation was delayed until a ample water supply was developed by wells and impounding.

★The U. S. Bureau of Mines is at present carrying on a geophysical survey of the molybdenum deposit in the Magnet Cove area. Mark C. Malamphy is in charge.

★The U. S. Bureau of Mines has completed its core-drilling project of the Gap Mountain barite deposit in the Ouachita Mountain area and is now proceeding with similar work on the Fancy Hill deposit, in the same area. R. B. McElwaine is the engineer in charge.

The Milwhite Co., of Houston, Tex., s leased property adjacent to the o Mountain barite deposit in Montmery County. Bulldozer trenching rk is being carried on, with core illing planned if promising surface owings are uncovered.

The Magnet Cove Barium Corporan, Malvern, expects early delivery a Sullivan diamond-core drill. A stematic drilling program is prosed to outline a large known ore dy and assist in planning an underound mining program. The orebody s in a syncline, and holes varying om 200 to 1,000 ft. in depth will be quired. Harry Brown, Malvern, is esident and general manager. Min- operations to date have been coned to stripping and quarrying. Apoximately 15,000 tons of crude is ing mined monthly.

After nearly four months of the orst weather that ever beset the atesville-Cushman manganese field, ine operators are gradually increasg operations since the weather eared up the last of May. Total proction for May was 828 tons, of hich 352 tons were low grade and 6 tons high grade. The Metals Reerve buying depot at Batesville, will ntinue purchase of high grade ore til January 1, 1946.

Davis Mining Enterprises, Batesle, John Mothershead in charge of erations, was the largest producer the field in May. Their production n to 415 tons of high grade. Their ashing and concentrating plant, cated on the Bayou about five miles om Cushman is now in steady operaon. It is the largest plant of its type r handling maganese ever conructed in Arkansas. Joe Jeffcoat, ri-State mill builder, designed and ilt the mill, and is now in charge of ill operations. Its capacity is 1,000 ns of crude per shift. Two new 5-ft. log washers have been installed. he entire plant is powered with ectricity.

The Arkansas Mining and Refining o., operating the North Star mine n Crooked Creek, near Harrison, hipped six carloads of mine-run zinc lphide in May. John Stone of Harrion is in charge of operations. Several ore carloads are awaiting shipment. he shaft on the North Star is down a depth of 130 ft. and ore is mined om seven drifts, one extending about 00 ft. from the shaft. They expect to some drilling on the property soon.

S. and G. Incorporated, operating e Hurricane mine near Pindall, earcy County, shipped one car of igh-grade carbonate of zinc ore in lay. Tom Grimmett of Harrison is in harge of operations. More ore in the ins is awaiting shipment. The new ill is in good condition and in daily peration.

R. R. Jones and associates of the ri-State district have taken over the nwata mine at the head of Jimmy's Creek, in Marion County. W. M. Higley, of Yellville, is in charge of operations. The Onwata was a carbonate mine during World War I, but has recently shown a good face of high-grade sulphide. The old producing tunnel was back in the mountain about 70 feet. They drove it to 80 feet farther, and ran into rich jack. The new face is about 15 ft. wide and 8 ft. high. An air compressor and drills will be received in June, and a mill will be built on the property in the near future. A lead mine on the McClain and Rowden property on Georges Creek, in Marion has also been taken over and operation will begin soon.

★Drilling operations on the Ten O'Clock Run, a fissure vein which runs through Stone and Taney Counties, Missouri, and enters north Arkansas at the mouth of Bee Creek in Boone County, are progressing satisfactorily. Operations are in charge of W. S. King, of Harrison. The hole now being drilled is a few miles from Hollister, Mo., and is down to a depth of 325 ft. Mineralization has improved with depth. Spotty values were struck down to 226 ft., but they become more uniform at 285 and below. Samples from the old Josie B. shaft on the vein about 500 ft. from the drill hole were recently tested and ran 12.42 percent metallic zinc. This shaft is down to a depth of 120 ft.

MISSOURI

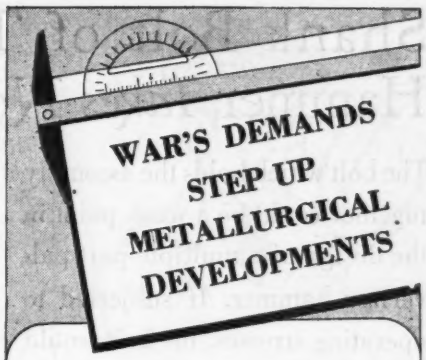
Bureau of Mines test-drilling the Alice mine for zinc sulphide—Barite tailings to be re-treated

★The Wemhaner Mining Co. has ceased operation of the Simpson zinc mine, in Moniteau County, and is opening a barite property in Morgan County.

★The D. F. & H. Mining Co., which formerly operated at Enon, has moved its 100-ton mill from the Enon property to a site one-half mile south of Russellville, Cole County. Jigs and tables are used and will be operated to recover galena and barite concentrates.

★The U. S. Bureau of Mines is conducting a drill test of the Alice mine, 12 miles west of West Plains, Ozark County. The mine has produced considerable zinc carbonate ore in the past and drilling is being conducted from the carbonate zone in an attempt to expose zinc sulphides at depth. It is reported that some zinc sulphide has been encountered.

★Mr. David Dunkle has joined the staff of the Missouri Geological Survey as a permanent member. He has been assigned to conduct an investigation of all limestone deposits in northern Missouri. This study will include



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S-14 Amsco-Clark pulverizer hammer and its shank bolt.

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Fig 5

Fig. 5 Detail of Amsco-Clark 3-part pulverizer hammer (patent applied for).

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Missouri (*continued*)

analyses of the occurrence and co position of all agricultural and ind trial limestone occurrences.

★The Missouri Geological Surv under the direction of Dr. Edward Clark, State Geologist, has two part in the field in southwest Misso studying the possibilities of zi mineralized areas adjacent to t Chesapeake fault and the Mia shear-trough. One party is working geological conditions and the other conducting a magnetometer survey the region.

★A 150-ton mill using tables and ji for the recovery of barite from taili piles, accumulated from former bari washing plant operations, is bei built at Lupus, in Moniteau Count L. E. Keeton is in charge of the pro ect. Before mill construction w begun samples were submitted to t U. S. Bureau of Mines for testing a a flowsheet of a recommended pr cedure was prepared.

TRI-STATE

Aluminum therapy demonstrate —Eagle-Picher develops orebod —Fatal roof fall at Swalley min

★Eagle-Picher Mining & Smeltin Co., which discovered a deeper run o ore in M-bed on the old Foley lease few months ago, is operating seve churn-drill rigs in the vicinity, stretc ing nearly a mile in a northeast direc tion from the old Kansas Explora tions Jarrett mine across the Fole and Mullen leases. The area bein drilled is about three miles north Picher in Kansas, and the ore di closed by the initial drilling at th 425-ft. level is about 100 ft. deepe than that of the old Westside, or Bar mines. The company is recribbing th old Foley mill shaft, which will b sunk to the lower level.

★American Development Co. ha started mine operations at the old Cor tez mill shaft, in the northeast par of Picher, according to W. T. Lan drum, of Baxter Springs, manage The company dewatered the old work ings to the 260-ft. level, and is con tinuing pumping operations to lowe the water at least another ten feet t open a lower run of ore. A 400-to wooden hopper and derrick, formerl used by the company on the Hun lease, to the northeast, was moved t the Cortez shaft, and a railroad spu off the old Southwest Missouri lin near by, now operated as a part o the N.E.O. system, is being extende to the hopper. Ore will be shipped t the Eagle-Picher Central mill fo treatment.

★Expiration of lease and inability t renew has forced the Semple Mining Co. to suspend operations permanentl

at its Early Bird tailing plant, northwest of Treece. However, operations are being continued by the company at its Martin tailing plant, near Hockerville.

★With depletion of the orebody, mining operations have been suspended by Kansas Explorations, Inc., St. Joseph Lead Co. affiliate, on the Snapp lease, two miles northwest of Oronogo, according to Ross Blake, of Joplin, district manager for the company. The company is continuing milling operations at the Snapp mill, treating ore from the Buckingham lease, a mile north of Oronogo.

★Four men were killed and two injured in the worst mine accident in the Tri-State district in six years, when they were caught under two slabs which fell at the Swalley mine of the Beck Mining Co., a mile and a half west of Baxter Springs, on June 8. Charles Andrew Abbott, a machine man, and his helper, Henry Pendleton, were caught by the first slab, which was about ten inches thick and 30 feet long, while at work in a drift heading. Four other men rushed immediately to their aid and were working to extricate them when a second slab, about five inches thick and some 20 feet long, fell on them. Two of the four, Arthur Pryor and William Archer, were injured fatally. The accident claimed the largest number of lives in a single mine accident since January, 1939, when five men lost their lives in a similar accident at the Southern mine, northwest of Treece.

★Dr. J. W. G. Hannon of Washington, Pa., medical director of McIntyre Research, Ltd., who is recognized as an outstanding authority on aluminum therapy for silicosis in the United States, spent several days during the latter part of May in the district conferring with mine operators, medical men and others associated with the local mining industry. Through arrangements made by Dr. M. A. Connell of the Picher hospital and F. F. Netzeband of the Tri-State Zinc & Lead Ore Producers Association, he gave an illustrated lecture May 29 before a joint meeting of district mining men and physicians at the association offices in Picher, which was followed by a demonstration of dispersing aluminum powder in a change house at the Eagle-Picher Netta mine before some 35 interested persons. Those who heard and talked with Dr. Hannon were much impressed by his explanation of the pathology of silicosis, its treatment with aluminum powder, and the simple and comparatively inexpensive application of the metal powder as devised and approved by McIntyre Research.

★Ernest V. Gent of New York City, secretary of the American Zinc Institute, also visited in the Tri-State district during the latter part of May. While here he discussed current problems of the mining industry, including the tariff issue, stockpiling and the premium price plan, at a special meeting of district operators called by O. W. Bilharz of Baxter Springs, president of the Tri-State Zinc & Lead Ore Producers Association, which was held in the association offices in Picher. Subsequently, Gent, together with Bilharz, also represented the industry before the senate hearings held in Washington on the house-approved bill to continue and expand the Reciprocal Trade Agreements Act.

IRON COUNTRY

Michigan iron-ore valuations little changed at tax hearing—Lake shipments in excess of last year's

★Horseshoe Mining Co. is developing the Rabbitfoot mine, about three miles southwest of Horseshoe dam on the Verde River. The company is working a two-foot copper vein showing 8 percent copper. The property is equipped with compressor and drills. Earl Miles is superintendent.

★A. L. Aplington is operating the Apache property under lease and bond. The old Apache is about nine miles southwest of Quartzite, Ariz. Development is on a copper-lead vein.

★The Williamtho Co. has taken a lease on the Hart scheelite property 14 miles southwest of Quartzite, from E. B. Hart, owner, and the ore will be concentrated at the mill in Quartzite.

★The Mt. Spring mine, three miles south of the Bagdad, is being worked by Charles Craig, under a lease from Lynch and Lawler, of Prescott. Work is progressing on a lead-copper and silver vein four feet wide, on which a 40-ft. shaft has been sunk. Three men are employed and the property is equipped with compressor, hoist, and pump.

★W. W. Bison has bought the Roosevelt Lode mine, in the Walker district, nine miles south of Prescott. Work continues in a 35-ft. shaft on a lead-silver and copper vein. The property is equipped with compressor, jackhammers, and small hoist.

★Mineral Hill mine, which has been operating under Arthur R. Breshear, of Cleator, has been taken over on lease and bond by R. S. Hall and associates, of Long Beach, Calif. Men are now trenching on the vein and a shallow shaft has been sunk. Ore containing copper, silver, and gold has been uncovered. Hall and associates are also taking over the Thunderbolt mine, south of Cleator. This is an old shipper and well equipped with mining machinery and a small flotation mill.

★Final valuation, for taxation purposes, of the iron-mining properties in the Upper Peninsular of Michigan were changed but little at the hearings held with company officials by the

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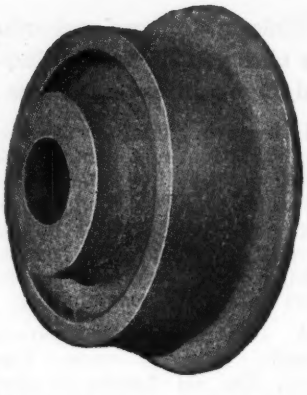

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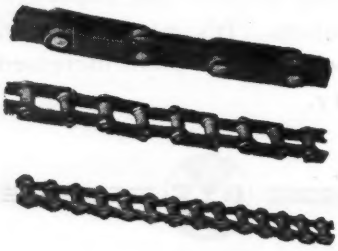

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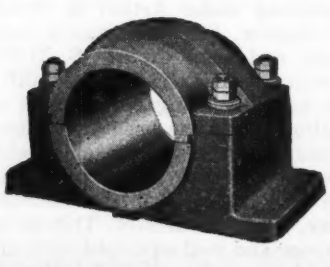

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BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES

DANVILLE, ILLINOIS

Iron Country *(continued)*

State Tax Commission last month. From a recommended total of $55,677,000 for 1945 only $70,000 was deducted. The total compared with $58,421,000 for last year. The greatest reduction was made on properties lying within the city limits of Negaunee, where a loss of $1,070,000 was confirmed after protests by the mayor and city attorney. Final valuation totals by ranges are: Marquette, $25,194,000; Gogebic, $16,790,000; and Menominee, $13,653,000. The figures recommended were presented to the Tax Commissioner by F. G. Pardee, State Appraiser of Mines.

★Iron-ore shipments from the Lake Superior District in May amounted to 11,121,203 tons, compared to 12,036,014 tons for the same month last season. Though this is lower than in May last year, the season's shipment to June 1 are still above the record for 1944, the total being 18,403,277 gross tons, compared to 17,402,290. At the Lake Superior & Ishpeming dock at Marquette, Mich., 44 boats were loaded in May, compared to 47 in April.

★At the Tilden open-pit mine of the Cleveland-Cliffs Iron Co., at Ishpeming, Mich., all steam-haulage equipment has been removed and the tracks have been replaced with macadam roads on grades not exceeding 10 percent. Ore, rock, and stripping waste is being hauled by five 15-ton Euclid trucks. Three of these are equipped with Cummins supercharged diesel engines, two units being without supercharge. The four steam locomotives formerly used are being cut up for scrap iron. H. O. Moulton is superintendent.

★Bids on stockpiles of low-grade iron ores and taconite were opened on June 11 in St. Paul, Minn., for the first time in the history of the State. Three bidders made offers on a 15,000,000-ton stockpile consisting of 4,000,000 tons of lean ore and the rest taconite, at the Missabe Mountain and Minnewas mines, at Virginia, Minn. Charles H. Remer, of Hibbing, bid on both the taconite and lean ore. A joint bid by David D. Haley and E. A. Young, of Hibbing, and one by J. H. MacKillican, of Hibbing, were received on the lean ore. The bids ranged from 12c a ton one ore running 25 percent iron, dry analysis to 20.2c a ton on open-pit contentrates.

★Trial of a lawsuit to determine ownership of approximately 7,000,000 tons of high-grade ore beneath Syracuse Lake, three miles northeast of Biwabik, on the Mesabi, was started on June 11 in the District Court in Duluth. The State of Minnesota is pressing the suit against the Longyear Holding Co. and about 40 other defendants who claim title to the property. The defendants are holders of property which surrounds the lake and therefore claim rights as holders of the ore under the lake. The State

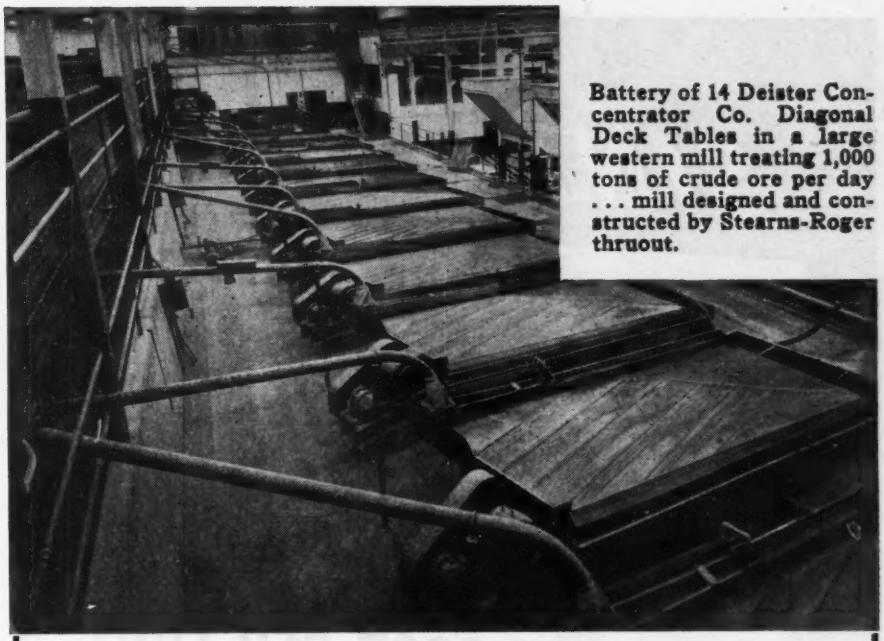
is asking a determination of whether it is the owner of the ore. It bases its claim on the theory that the waters are of a navigable nature and therefore are the property of the commonwealth. The lake was drained last year and mining was begun after the ore had been stripped. The opening of this mine, an open-pit operation, was undertaken in connection with war demands. Diversion of waters was required to reach the orebody. Involved in the dispute is a treaty between the United States and Great Britain made in 1843. The state claims that Syracuse Lake, and its inlet and outlet tributaries to the Embarass River were the original international boundaries and also trails of early fur traders. The defendants point out that the boundaries were established as they now stand and that therefore the patents granted by the federal government for the ore properties still are valid.

★M. A. Hanna Co. suffered a loss on May 10 when fire destroyed the coal and coke preparation department of the sintering plant which it recently acquired from the Evergreen Mining Co. at Crosby, Minn., on the Cuyuna Range. The fire apparently started in the material-preparation room on the ground floor and the flames spread to the two upper floors, which were also destroyed. The sintering plant proper was not touched by the fire, because it was protected by a concrete fire-wall which separates this part from the fuel and ore-preparation units. Damage has been estimated at $100,000. The plant will be down for about 60 days.

MICHIGAN

Quincy reclaimed copper from mill sands last year at cost of 10.26c per pound, and reduced indebtedness

★Quincy Mining Co.'s reclamation plant, erected under contract with Metals Reserve and with MRC funds, has proved successful in recovering copper from the stamp sands deposited in Torch Lake by the company's No. 1 stamp mill prior to 1910. Last year 1,124,000 tons of sand was treated and 5,,581,745 lb. of refined copper produced, the recovery being 4.97 lb. per ton. Average cost was 10.26c per pound, before depreciation and depletion charges, but including interest payments of $43,238 to Metals Reserve. Some additional equipment is being installed to increase capacity and efficiency in handling very fine sands. Out of earnings from Nov. 1, 1943, to Dec. 31, 1944, Metals Reserve has been repaid $315,112. As of the latter date the amount still due against advances for erection of the plant was $905,229. During the first



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Michigan *(continued)*

quarter of 1945 the indebtedness was further reduced by payment of $60,611 from operating profits. The plant should be free of debt by the end of 1948. Due to the increase in operating costs in the past few years it seems probable that both mine and mill will have to shut down when the special price contracts now in effect are terminated. This will leave the company with only its reclamation plant.

★Michigan State Tax Commission has reduced the assessed valuation of mining properties in Houghton and Keweenaw Counties by $766,255. A total valuation of $4,862,840 was established, compared with $5,629,095 last year.

★"The need for copper for war purposes has been the reason for the payment of prices for Michigan copper in excess of the pegged market price," says Franklin G. Pardee, state appraiser of mines. "Just how long the government will continue to pay these prices has not been decided, but it is obvious that with the present costs the Michigan mines require some help in order to keep operating. The future price demand for copper, especially in the transition period between the end of the war and the resumption of the normal copper market, is very important not only in determining the valuation of the mines but also for the long-range planning that is necessary to operate deep underground mines. The uncertain price situation is a decided hardship to the producers and miners of Michigan copper who are trying to find some answer to postwar production problems. The need for some method of control for the surplus copper that will be on the market after the war is even more pressing this year. The solution of it is of extreme importance to the people living in the Michigan copper district."

ALASKA

Golden Zone resuming operations —Asbestos deposit opened on Kobuk River—Placer operations starting

★W. E. Dunkle, president of the Golden Zone Mining Co., has announced to stockholders that work at the mine will be resumed this summer under an agreement reached recently with the St. Eugene Mining Corporation, a subsidiary of Ventures, Ltd. The Canadian company is to spend $300,000 in the development of the Golden Zone property, which is situated in the Alaska Range near Colorado Station on the Alaska R. R., and it is expected that production may reach 300 tons a day this summer.

★E. N. Patty, manager of Gold Placers and Clear Creek Placers, has been in Fairbanks and Dawson preparing to start operations of these companies. The dredge of Gold Placers is situated on Coal Creek near Circle, and that of Clear Creek Placers in the Yukon Territory near Dawson. These operations will be the only ones worked this summer of the five managed by Mr. Patty. A prospecting crew is drilling placer ground on the Selwyn River.

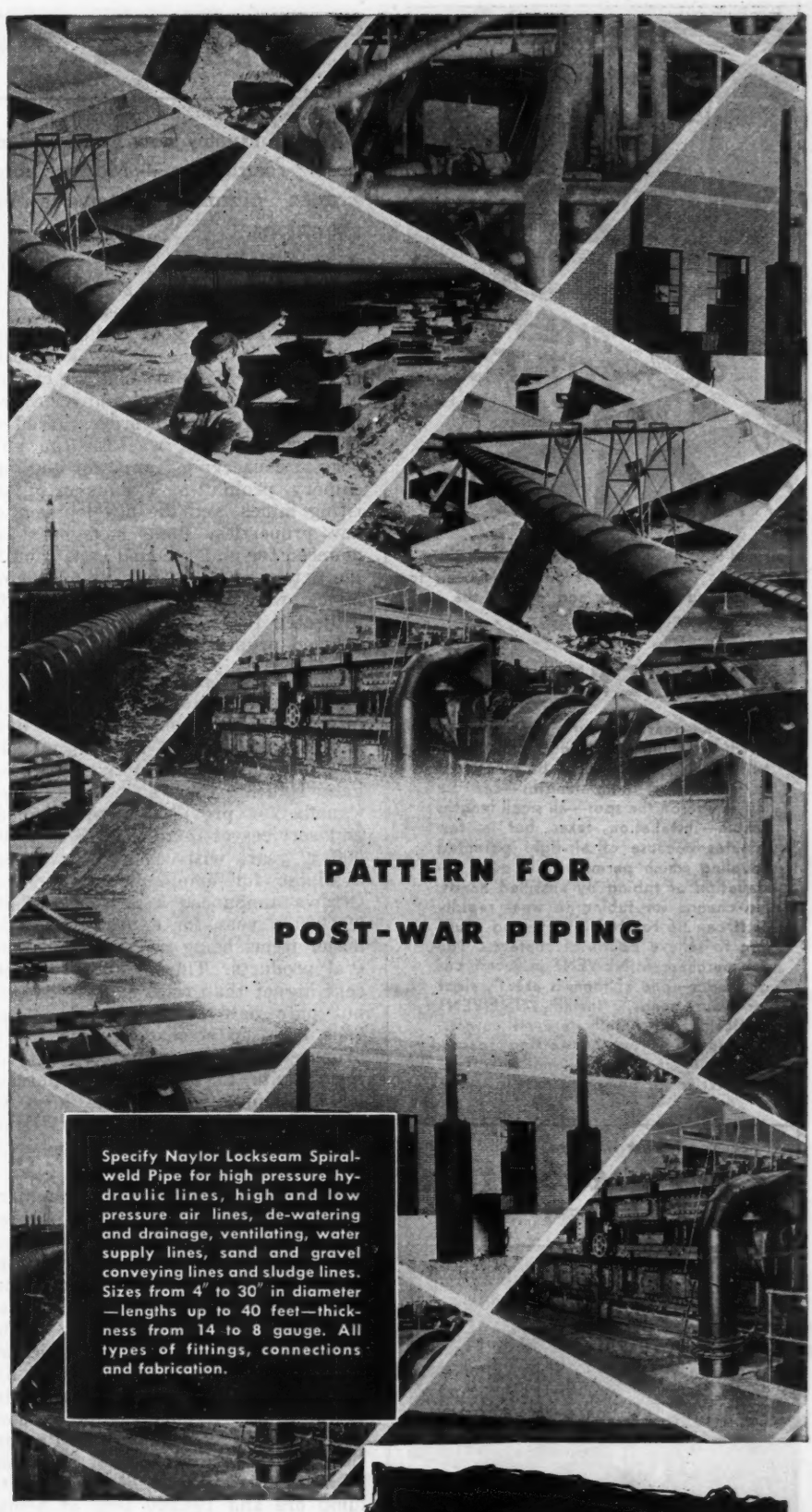
★Ventures, Ltd., of Toronto, has been granted permission to operate on a full prewar scale the properties of Alaska Empire Gold Mining Co. at Hawk Inlet near Juneau. Work is to start as soon as weather permits. A new power plant has been installed at the Inlet. W. S. Pekovich is manager.

★A trust agreement has been recorded at the U. S. Commissioner's office at Fairbanks by Oliver D. Morris and George E. King, which includes a declaration of unit interest in the Point Barrow Western Arctic Exploration Syndicate. It provides for exploration, prospecting, and opening mining ground in the Western arctic region of Alaska. Both lode and placer claims may be developed, and leases executed. Other persons and corporations may be admitted to unit membership.

★U. S. Smelting, Refining & Mining Co. is opening its Chatanika, Ester, and Goldstream camps, according to Roy B. Earling, general manager. At Chatanika, the Davidson and Middle ditches have been opened, and dredge No. 10 has been prepared for operation. Some thawing and stripping will be done at Chatanika, but the Chena pump station will not be operated this year. All operations will be conducted on a reduced scale because of manpower shortage. Men now employed are not suitable for Army or war contracts because of age or physical disability.

★The U. S. Geological Survey has discovered a possible new supply of wolframite in Alaska. It is in the central Kuskokwim district on the northeast side of Taylor Mountains, 10 miles southeast of the Holitna River, and 50 miles south of Sleitmut. Specimens of quartz containing crystals of wolframite two inches long were found in loose rock on Stevens Creek.

★B. D. Stewart, Alaska Commissioner of Mines, continues to ship out strategic minerals purchased in the Territory under the Metals Reserve program. Total purchases, which include antimony, tungsten, tin, mercury and chrome from Fairbanks, Nome, Seldovia, and Anchorage, approximate $500,000. Mr. Stewart also reports receipt of hundreds of letters from soldiers who would like to come to Alaska to prospect, and establish claims in the future.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CANADA

Mining industry now freed of wartime restrictions — Many companies planning extensive explorations

★Order M.C. 19 was rescinded on June 7 by the office of Munitions Minister Howe. This removes all controls on the mining of gold and other minerals and metals and leaves the industry free to sink shafts, expand underground workings, and open new mines. The original order, in effect on June 22, 1942, was for the purpose of conserving manpower and machinery, prohibiting expansion of existing mines, and the development of new properties. Plans have been announced for underground expansion to the extent of 200,000 ft. at producing mines, with an additional 50,000 ft. projected for shaft sinking on undeveloped properties.

★Mining can be kept at wartime capacity under favorable domestic and international economic conditions over a period of years, it is thought. The new skills and productive facilities gained during the war have equipped Canada for providing civilian goods and services estimated at $5,000,000,000 a year, with 4,500,000 workers available for employment. In June, Ottawa announced a goal of $1,750,000,000 a year for export trade, the major items being minerals and mineral products. This is about 60 percent higher than total exports in 1938 but only half the market that has been built up since that year. It is proposed to develop trade by extending credits to devastated countries, by developing all possible markets, and expanding the merchant marine.

ONTARIO

★Slow delivery of plant equipment for the Josephine mine of Michipicoten Iron Mines, Ltd., has delayed production until sometime in July. The property, adjoining the new Helen mine, has developed a ten-year supply of ore. After sintering, shipment will be made by Lake boat from Michipicoten Harbor 100 miles to the plant of Algoma Steel Corporation at Sault Ste. Marie, Ont. Algoma Steel has contracted through Algoma Ore Properties to purchase an annual minimum of 75,000 gross tons of open-hearth lump ore and 194,000 tons of hematite concentrate over a period of seven years. Sherritt Gordon Mines controls the Josephine and the adjoining Ruth mine, where reserves of siderite ore are reported to be 28,600,000 tons. No development is to be undertaken at present, according to E. L. Brown, general manager.

★Chesterville Larder Lake Gold Mines has discovered a new orebody, the "J" zone, according to L. T. Postle, mine manager. This is located in altered porphyry on the 9 and 11 levels, the length being 400 ft. A crosscut is being extended to the new structure on the 10 level. Chances of finding ore at lower horizons are believed good. In green carbonate ore of the "D" structure, probable ore amounting to 1,000,000 tons has been found below the 7 level, but this will not be classed with reserves until more work has been done. The "D" zone has been explored down to the 12 level. Later this year, the main shaft is to be continued below the 1,785-ft. horizon to open several new levels.

QUEBEC

★East Malartic Mines, D. M. MacLean, general manager, reports promising results from developing the east orebody at the 600-ft. horizon. A length of 350 ft. has been indicated by nine drill holes, with evidence that ore persists to the east. At the 800-ft. level this ore is restricted to a 200-ft. length. The area will be explored on the 1,000-ft. level, when this depth has been reached by the new shaft later this year. The ultimate objective of the shaft is 2,600 ft.

★O'Leary Malartic Mines has issued a list of property holdings with its balance sheet for 1944, which shows investments valued at $407,500; cash, $55,471. Five groups of claims are located in Laverlochere Township and four groups in Gaboury Township, on which two gold discoveries have been reported. In Chibougamau, a 600-acre property is held; claim groups are being maintained in Destor, Montbray, and Rouyn townships. Substantial stock interests are reported in a number of properties in the Mud Lake, Duparquet, Cadillac, Siscoe, and McWatters areas. Gordon G. Calder is president.

★New Calumet Mines, controlled by Ventures Limited and which began producing in 1943, is now mining gold ore at the rate of $140,000 monthly, of which about $60,000 is said to be operating profit. Debts amounting to $1,000,000 are expected to be written off within the next year. Metals Reserve contracts expire in September, but present negotiations are expected to assure outlets for lead and zinc concentrates. Stoping is in progress on the 500-ft. level from the main shaft, and on the 100 level from the MacDonald shaft, 1,100 ft. northwest. The mill handles 600 tons daily, recovering base metals with some gold and silver.

★Beattie Gold Mines, in Duparquet Township, has deepened the Donchester shaft to open nine levels to permit exploration of drill indications of ore below the sixth horizon. Tonnage estimates will be made after further drilling has been done on the fourth and fifth levels. Removal of the overburden that flooded the workings from the open cut a year ago has been

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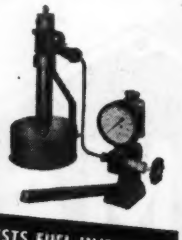

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Canada *(continued)*

delayed. The mine has been cleared above the fourth level, and production of gold and arsenic will be started as soon as glacial till has been removed from two more levels. Ore reserves are reported to be 3,778,400 tons averaging 0.13 oz. gold per ton. Operations last year resulted in a net loss of $542,528 after depreciation. W. B. Maxwell is president.

BRITISH COLUMBIA

★In an address before the Engineering and Mining Bureau of the Vancouver Board of Trade, the Hon. E. C. Carson, Minister of Mines for British Columbia, declared "Relaxation of tax impositions is a dire necessity if the mining industry is to be maintained." Mr. Carson, who was the first to conceive the idea of a Dominion-wide organization of Provincial Mines Departments, said that increased allowances both to companies and to shareholders is included among recommendations being made by the Inter-Provincial Committee of Mines' Ministers, and he urged the necessity of presenting a strong case to the federal government. He said that assurance had been received from the National Selective Service and from the War-time Bureau of Technical Personnel that key men now serving in the armed forces would be given priority as soon as possible to return to mining. He felt that mining would play a more important role in postwar rehabilitation than any other Canadian industry. The Minister predicted a much wider use of air transportation by the mining industry, and said he thought the Provincial Government should investigate the possibility of assisting with air facilities in mining development as it had formerly provided roads and trails for the same purpose.

★To May 31, 1945, the annual date for expiration of Free Miner's Licenses in British Columbia, staking of 926 claims was reported by Patrick J. Mulcahy, chief gold commissioner. This compares with 437 during the previous year. Lillooet, Nanaimo, and Victoria mining divisions appear to have been paid the most attention by prospectors, 179 properties having been staked on Texada Island, Nanaimo division. In the Vernon division, eight claims were taken up, and in the Alberni division, immediately west of Nanaimo, 24 new recordings were made.

★W. B. Milner and Transcontinental Resources, Ltd., have purchased a controlling interest in Polaris-Taku Mining Co., Ltd., and incorporated Taku River Gold Mines, Ltd., as a holding company. The new owners will reopen the Polaris-Taku mine, in the Atlin mining division, as soon as men and equipment are available. The plant is equipped with a 300-ton mill, to which it is proposed to add a roasting plant at an estimated cost of $150,000 to obviate the necessity of shipping concentrate to the Tacoma smelter. The mine has been left in excellent condition to resume operation on short notice. Prior to closing, a shaft was sunk and three levels were opened. Development on the lowest levels has been most encouraging. Ore reserves exceed 300,000 tons of better than ⅓-oz. ore.

★Silbak Premier Mines, Ltd., Portland Canal district, received net smelter returns of $40,541 for April production recovered after treatment of 5,349 tons, averaging 0.21 oz. gold and 1.63 oz. silver per ton. Estimated operating loss before write-offs was $10,400.

★During the first quarter of 1945, Premier Border Gold Mining Co., Ltd., produced 193 oz. gold, 1,742 oz. silver, and 55,134 lb. lead, all valued at $9,751, from 852 tons of ore milled. After mining costs of $2,992, and milling, marketing, and mineral tax of $5,044, a net profit of $1,615 was earned. This was retained by Silbak Premier Mines, Ltd., and consequently reduces Premier Border's indebtedness to $9,188.

★Salmon Gold Mines, Ltd., Portland Canal district, has let a contract to Boyles Bros. Drilling Co., Ltd., for 5,000 ft. of diamond drilling at the Salmon gold property. Work will be started as soon as ice leaves a nearby lake, at which time supplies and equipment may be transported by plane.

★The newly incorporated General Exploration, Ltd., has acquired an option on the Silver Leaf mine, at the headwaters of the Nanaimo River, Vancouver Island. A development program is now being worked out. Chief values are in gold and silver.

★During the fiscal year ended March 31, 1945, Pioneer Gold Mines of B. C., Ltd., produced 9,545 oz. gold and 1,692 oz. silver, valued at $368,134. Miscellaneous income was $59,327. Operating cost was $380,242. After provision of $22,953 for depreciation, $12,299 for depletion, and $36,124 for exploration and prospecting, net loss for the year was $24,157. Most significant feature of the report was the steady improvement of the "27" vein at depth. On the 25 level mining widths average 5.06 ft., and grade 0.536 oz. per ton, compared with average width of 2.20 ft. and grade of 0.233 oz. on the 19 level. Regarding this development Dr. H. T. James, managing director, states: "A considerable amount of work has been done in the past above the 19 level but with indifferent results. The vein dips westerly at 52 deg., and if it maintains this dip the productive section of the vein would begin to cut across the company's end lines about 1,200 ft. vertically below the 25 level." Col. Victor Spencer, president, states: "There have been no additions to proved ore reserves during the year, but development so far completed indicates the probabil-

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Canada *(Continued)*

ity of an appreciable tonnage in the '27' vein. It is now evident that this may be an important factor in extending the life of the operation." Ore reserves as of March 31, 1945, were estimated at 194,459 tons, averaging 0.425 oz. gold per ton.

★In the first diamond-drill hole driven from an underground station in its current program, Minto Gold Mines, Ltd., Lillooet district, cut a heavy mineralized quartz vein at 454 ft. The core length of 34 in. averaged 1.51 oz. gold per ton. A second hole is now being drilled from the 500 level to prove the vein at greater depth.

★Grull-Wihksne Gold Mines, Ltd., is doing surface work on its Bridge River property, preparatory to undertaking diamond drilling in two different parts. Bridge River Consolidated Mines, Ltd., has announced its intention of driving a tunnel of about 300 ft. on the Ural claim. When the contact has been reached it is proposed to drift north and south and establish diamond-drill stations, from which holes will be driven almost vertically to intersect any veins masked by the serpentine-diorite contact.

★During the fiscal year ended Dec. 31, 1944, Hedley Mascot Gold Mines, Ltd., produced 13,622 oz. gold, valued at $536,809, from 42,285 tons averaging 0.34 oz. gold per ton. The mill operated only from March 16 after suspension of production for seven months. Development included 1,684 ft. of drifting, 678 ft. of raising, and 9,435 ft. of diamond drilling. A long low-level tunnel is being driven 600 ft. below the lowest previous workings to test the Mascot ore structures which extend from the Mascot claim across the corner of the Morning into the Nick-of-Time. Another major project was recently started with the driving of a long inclined raise from a point on the Eagles Nest claim through this and the Zerust claim to connect with the 3,700 level near the eastern boundary of the last-named claim. The lower end of this incline will be connected by surface cable with the mill.

MANITOBA

★Howe Sound Exploration Co. is preparing for active mining operations at the Nor-Acme property, on Snow Lake. From extensive diamond-drilling (more than 50,000 ft.) and trenching, ore reserves are estimated at 4,860,900 tons, averaging $5.25 per ton, divided between two orebodies. One contains 4,661,000 tons averaging $5.20, and the other 199,900 tons averaging $6.43. The larger of the two is understood to be in the neighborhood of 1,000 ft. long and up to 100 ft. wide, but has not been completely delimited by diamond drilling. With ordinary luck in development, the orebodies so far explored should be able

to supply a 2,000-ton mill for 15 years.

The program at present laid out involves construction of a 35-mile road from Mile 82 on the Hudson Bay Railway, sinking a five-compartment shaft to 1,000 ft. initially with haulage levels at 250-ft. intervals, and the erection of a 2,000-ton cyanide mill. It will thus be the largest gold mine in Manitoba. Power will probably be obtained from the Churchill River Power Co., a subsidiary of Hudson Bay Mining & Smelting Co., by construction of a power line about 50 miles long from the branch of the power line supplying Sherritt Gordon Mines. The company is hoping the program will be advanced sufficiently so that shaft-sinking equipment may be taken in during the coming winter. George C. Lipsey, at present mine superintendent at the Britannia Beach mine of the Howe Sound Co., will be manager at the Snow Lake property.

★Sherritt Gordon Mines has announced the finding of two offshoot orebodies in the zinc ore section of the east mine at Sherridon. It had been expected that this section of the mine would be exhausted by the fall of this year, but the new offshoots will give another year of life. E. L. Brown is general manager.

★Diamond-drilling by Wekusko Consolidated on its Squall Lake claims in the Snow Lake district, which has been in progress since March 26, seems to indicate the presence of a medium-grade commercial orebody. Along with many lower values, two intersections of as high grade as 2.38 oz. gold over 3.5 ft. and 1.03 oz. over 3.0 ft. were encountered. G. Brock Tribble is engineer in charge.

★Sannorm Mines has contracted for a magnetometer survey of its property in the Rice Lake district, to be followed by 20,000 ft. of diamond drilling. The metadiabase sill in which the orebodies of the San Antonio mine are found run directly through the middle of the Sannorm property. Operations will be under the direction of Dr. J. F. Wright, consulting engineer.

MEXICO

Mining industry not yet benefited by silverware exports—Tungsten deposits found in southern Sonora

★The Confederation of Chambers of Commerce has issued an illuminating review of the silver bullion export situation. This business fell to 324,459 kg. last year, only about a seventh of a normal year's trade, from 2,287,170 in the peak year of 1938. The decrease was attributed largely to the Mexican government's policy of devoting much silver, 1,600,000 kg., to minting in 1943 and 1944, and to reinforcing the silver metallic monetary reserve. How-

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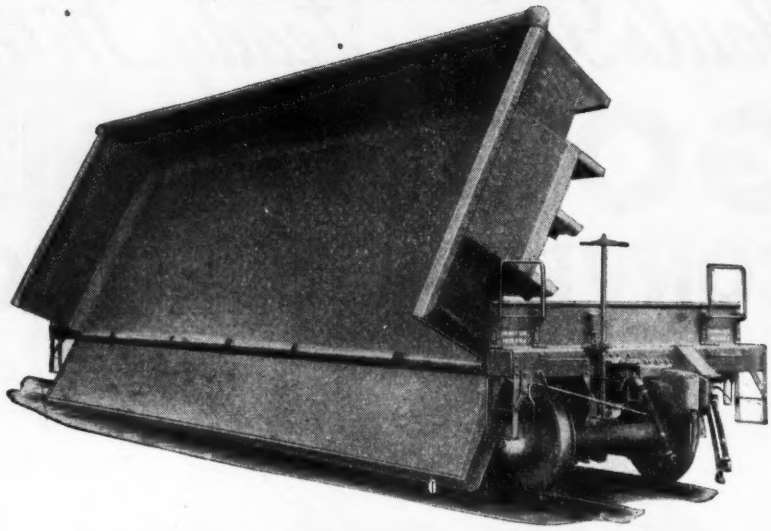

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Mexico (*continued*)

ever, the Confederation declared, this policy has not at all hurt the silver branch of Mexican mining, as the government is buying white metal involved in this policy from Mexican mining companies. But the Confederation holds that the government's plan to offset falling bullion exports by building up those of silverware is still far short of expectations. This amounted to only 1,884, 844 pesos last year, and has not as yet benefited mining in the least, though this trade has had a remarkable rise from the mere 52 pesos' worth shipped abroad in 1939. Silverware exports, now mostly to the United States, Guatemala, Brazil, and Uruguay, must be much greater if they are to aid mining to any appreciable extent.

★Definite deposits of scheelite exist in southern Sonora, John H. Wiesse, of the U. S. Geological Survey, and Ing. Salvador Cardenas, of the Geological Institute of Mexico, informed the Ministry of National Economy that had commissioned them to make the exploration. The geologists stated that tungsten production in southern Sonora would be doubled were prospectors enabled to use the ultraviolet lamp in their work.

★Agrarians of La Dicha settlement, near Chilpancingo, Guerrero, have asked the National Commission for Stimulation of the Mining Industry to permit them to exploit gold and copper ore discovered while plowing last September. Geologists Birgir Soundstroum and Ing. Abraham Quintanilla Gonzalez are said to have reported good value for gold and copper-ore samples from the tract and to have found that the gold-bearing area is about 800 meters square. The deposits are close to the Mexico City-Acapulco road.

★Mining operations in the Pachuca, Hidalgo, zone, site of some of the world's greatest silver mines, have so increased that several small mines abandoned years ago because they were unprofitable are reported to have resumed activity. Several Pachuca mines, the report says, have installed machinery. Others are arranging to.

★The Dos Carlos, Mexico's pioneer mining cooperative in Pachuca, Hidalgo, started in July, 1937, by the Cardenas government by taking over properties of the British-owned Cia. Minera de Dos Carlos, S. A., has been granted a cash subsidy of 340,000 pesos ($69,500) by the state government. The subsidy was ordered by Governor Aguirre to enable the cooperative to intensify its work. Dos Carlos and San Rafael, another mining cooperative in the Pachuca sector, are jointly installing a metal-treatment plant at Mineral del Chico, near Pachuca.

★The Santa Fe cooperative, Guanajuato City, is being helped out of a

deficit by voluntary action of its more than 1,500 members, who are accepting half pay in cash and the rest in notes payable when the business is in better financial condition announced the society's new executive committee. The members are also working harder, which has increased the cooperative's production, mostly gold. The cooperative has installed a compressor and is soon to add other equipment to increase production.

★Mining has been embarrassed by fresh labor troubles of the National Railways, this time by a form of sabotage of freight and passenger train crews in adopting a policy of "excessive slowness" in train operation to enforce demands for better working conditions, which the government-owned company contends are already exceptionally good. "Excessive slowness" lasted for several weeks, but has now more or less ended due to intervention of President Manuel Avila Camacho. The slowness hampered ore movements and augmented stockpiles that mining companies had already accumulated through faulty rail service. But National Railways is improving freight service with the acquisition of more rolling stock and again announces that service will be normalized soon. The "excessive slowness" policy prompted protests to the government by many miners who declared that it worked hardship on their employers.

★While Mexico increased her production last year of copper, zinc, lead, mercury, antimony, graphite, arsenic, and tin to a total of 664,897,404 kg. from 634,842.201 kr. in 1943 and 563,537.492 in 1942, last year's output of precious metals, particularly gold and silver, fell to 2,302.031 kr. from 2,708.984 in 1943, announced the Ministry of National Economy. The report gives only general totals and does not specify the output of each metal. The Ministry expects an increase in precious metals output this year, but says nothing about that of the industrials. Reports in the mining industry and business circles are that production of industrials is due for a drop soon owing to decreased demand for them in the U. S. with the defeat of Germany.

CHILE

Arbiter to settle labor disputes at copper mines—Lead-zinc ores in Aysen province to be developed

★Labor strikes of short duration at the Potrerillos property of Andes Copper Mining Co., and at the Chuquicamata plant of Chile Exploration Co. (*E. & M. J.*, May, 1945, p. 154) were ended on request of the government and the proposal of the President to resolve the disputes by

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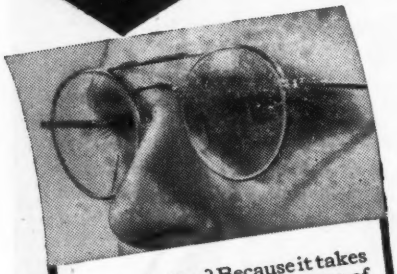

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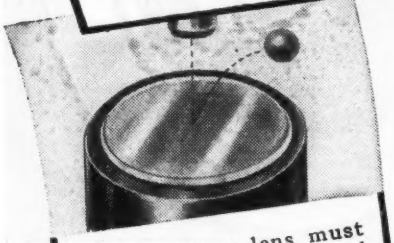

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Chile *(continued)*

appointing a single arbitrator for both conflicts. Senor Moisés Poblete Troncoso has been appointed to that position.

★Chile's bar-copper production figures for 1944 have recently been released and are tabulated herewith for the five enterprises producing copper. Figures for 1944 were slightly larger than those for 1943, when production of fine copper in all types of bars was 488,501.3 metric tons. To obtain the total copper production of Chile for 1944 it would be necessary to add to the figures given those of ores and concentrates bought by U. S. Commercial Co. to be exported to the States or stocked at Chilean ports until ship space can be obtained.

Name of Company	Type of Copper	Metric Tons
Chile Ex.	Electrolytic	242,173.5
Andes	Electrolytic	22,972.7
Andes	Blister	52,562.3
Braden	Fire refined	158,598.0
Chagres	Blister	8,091.1
Naltagua	Blister	6,981.0
Total		491,378.6

★Caja de Credito Minero (Chile's mining loan bank) has also got together its figures for 1944. Such figures show a decrease in the bank's activities for last year compared with former years. The money value as paid out by the bank for all mining products bought, mainly copper, gold, and manganese, was as follows:

1942, US $4,500,000
1943, " 3,680,000
1944, " 3,410,000

These figures show a decrease of 7.3 percent for 1944 in comparison to 1943. Gold ores were most affected, the value dropping from US $1,651,000 to $1,314,000 or 20.5 percent. By contrast with the gold ores, copper ores made an appreciable increase for 1944 in comparison to 1943, rising from 25,559 metric tons (US $640,000) to 30,051 ($699,000). The exception shown by copper ores is because Caja de Credito Minero has been paying the same bonus price as U. S. Commercial Co., in spite of the fact that this agency has for a considerable period ceased payment of bonus. Consequently, to keep the small mining industry alive, Caja has been making up the loss on the difference between U. S. Commercial Co. bonus prices, which were increased up to 20 percent above the original flat rate, and present U. S. Commercial Co. prices. Since other commercial ore-buying firms have not been in a position to pay the bonus, Caja has bought more copper ores than in other years.

★The Government Statistical Bureau has released production figures for mining for the first quarter of 1945, as follows:

Sodium nitrate, metric tons	289,000
Iodine, metric tons	213
Copper, metric tons	121,000
Iron, metric tons	9,000
Metallic gold, kg.	1,244
Metallic silver, kg.	6,730
Coal, metric tons	532,900
Men employed	52,476

★The Chagres smelter is now reducing practically all of the country's output of copper concentrates, excepting those produced by Tocopilla mill, in the northern part of the country, since the Naltagua smelter was shut down last December. On this account, bar copper output of Chagres has risen from an average of 700 metric tons of copper to 1,100 tons per month.

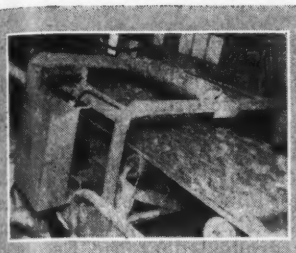
★Recently, after long litigation, the different groups of persons who had claims on the large lead-zinc deposits in Aysen Province (*E. & M. J.*, August 1942, P. 80) came to an agreement and formed a company under the name of Lago Buenos Aires, on account of the fact that the deposits are very near the shores of this lake. The development of these mines will involve a difficult transport problem, as the Chilean railroads reach only as far south as Puerto Montt, latitude 41 deg. 30 min. From here a sea voyage must be taken to Puerto Aysen, latitude 45 deg. 20 min., and then a rather long trip by automobile to the northern shore of the lake, which must be crossed to the small town of Chile Chico, near the Argentine border and on the southern shore of the lake. Under such circumstances, it seems likely that pig lead or zinc must be produced on the spot to make economic development possible.

★Recently workers in the nitrate mines and plants of Pedro de Valdivia and Maria Elena went on strike after the vote specified by law was taken. Previously, the different points of view between the workers and the Cia. Salitrera de Tarapaca y Antofagasta had been settled. As there is a considerable discrepancy between the demands of labor and what capital is willing to concede, it is likely that the government may have to intervene to settle this strike in what is today the second important mining industry of Chile. The main demands of the workers have been expressed in nine points, but these demands are so much above anything reasonable that, taking them even as a basis for discussion, there seems little likelihood of a satisfactory arrangement. As in the case of the strikes in the large copper mines of Chuquicamata and Potrerillos, it seems reasonable to expect that the government will compel the men to go back to work and nominate an arbiter to settle the points at issue.

BRAZIL

Integrated aluminum plant now in production—Refined tin being produced from domestic concentrates

★Operation of the new aluminum plant of Electroquimica Brasileira SA, at Ouro Preto, Minas Gerais, was started officially April 1. The plant is the first completely integrated alu-



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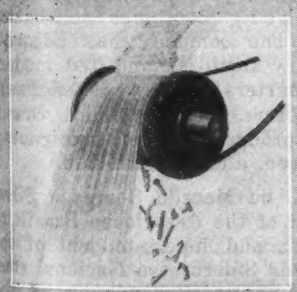

Dings High Intensity Magnetic Drums are designed for stationary installations at the bottom of chutes, etc. Cylindrical shell revolves around a powerful magnet. Automatic operation.

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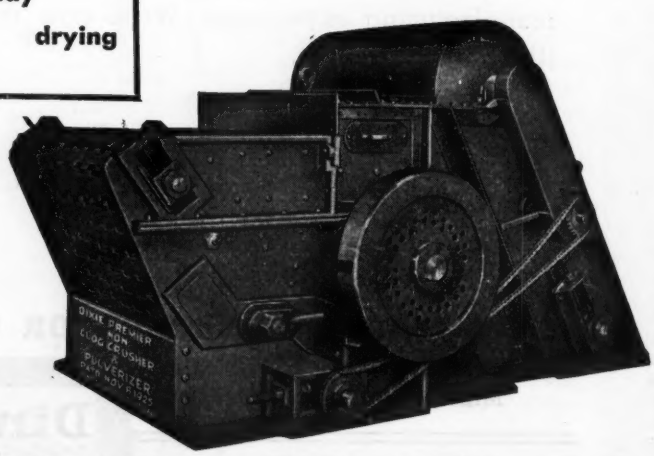

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Brazil *(continued)*

mina and reduction works ever built south of the Rio Grande, and Brazil is now an aluminum-producing country. Eletroquimica Brasileira is a Brazilian concern with headquarters in Belo Horizonte, Minas Gerais. Dr. Americo Rene Gianetti, an active mining engineer graduated at the Escola de Minas de Ouro Preto, is president. Total cost of the plant, including the hydroelectric units, is U. S. $6,000,000. The plant will supply a considerable part of the fast-growing Brazilian requirements of aluminum. Ingots are hauled by rail to the processing mills of Sao Paulo, the center of the non-ferrous industry, and to Rio de Janeiro.

The plant is integrated in the sense that the company generates its own hydroelectric power, mines its own bauxite, which incidentally is located less than two miles from the works, and produces the alumina for reduction in the pot room. Bauxite reserves are reported to be about 3,000,000 tons of loose, light-yellow ore that runs between 55 and 60 percent Al_2O_3 and less than 6 percent SiO_2. Three hydroelectric power plants, Salto, Caboclo, and Funil, at the Maynart Rover, total 17,000 hp. New power sites are being studied, as the district affords opportunity for considerable expansion.

The Bayer process plant constructed according to plans of the Dorr Company, New York, is to produce 12,000 tons of alumina per year. The pot room comprises 44 cells of 24,000 amperes and 250 volts, continuous current being supplied by four motor-generator sets of 2,000 kw. each. Excess alumina will be available for the production of white aluminum sulphate for paper mills or for export.

The anode plant uses imported petroleum coke and has a capacity of 10,000 tons a year of anode paste for Söderberg continues self-baking anodes. The company has adequate laboratory facilities and 120 modern living quarters for the staff engineers and laborers. Electroquimica Brasileira SA produces also ferromanganese, ferrosilicon, and sulphric acid.

★Cel. E. de Macedo Soares e Silva, president of the Associacao Brasileira de Metais and superintendent of the Companhia Siderurgica Nacional steel plant of Volta Redonda, gave the Associacao's annual lecture May 14. He stated that Brazilian production of steel at the end of 1946 will reach the 600,000-ton level, half of this output being produced by the Volta Redonda plant under completion. The plant will utilize washed coal from Santa Catarina for the Koppers coking plant at Volta Redonda. A thoroughly modern coal-washing plant at Capivarvi de Baixo, Santa Catarina, has just been put in operation by the Companhia Siderurgica Nacional. This plant was designed by McNally Mfg. Co., Pittsburgh, and can treat up to 400 tons per hour of run-of-mine coal. Santa

Catarina coal is high in ash and requires washing prior to coking.

★Production of charcoal for blast furnaces was recently discussed by G. P. Baeta, of the Companhia Siderurgica Belgo-Mineira, at the annual meeting of the Associacao Brasileira de Metais at Volta Redonda. Mr. Baeta presented an interesting survey of Minas Gerais practice in hardwood charcoal production, showing the need for improvement in technique, as both labor and wood are getting more expensive. Brazil is probably the largest charcoal pig-iron producing country (320,000 metric tons in 1944) and the blast furnaces are consuming about 1,200,000 cubic meters of charcoal per year.

★Metalurgica Jofremars Ltda., Rio De Janeiro, DF, is producing refined tin from several mines at Sao Joao d'El Rey, Minas Gerais. The concentrates run between 62 and 68 percent tin and are hauled down to the coast by rail. A reverberatory coal-fired furnace with pin-hole grates is used for smelting of ore, and the slags are resmelted to free them from entrained metallic and combined tin. The company is installing a small Mace water-jacket blast furnace and a new sinstering unit. J. F. Souza Martins is the manager and C. H. Yahn is the metallurgist in charge.

★At a recent meeting of the Associacao Comercial de Sao Paulo, A. A. Brumfield, combustion engineer of the Board of Economic Warfare at Sao Paulo, discussed the present status of coal production in Northern Parana. He stressed the importance of these coal fields and showed the increase of production of coal in recent months as the result of imports of coal-mining machinery from the United States. It is believed that these coal fields, with good-grade coal seams of two to five feet in thickness, can be worked at the rate of 40,000 tons per month, should equipment be available and the present transportation improved. This amount of coal will be of substantial help to the industries around Sao Paulo, which have been drawing hard on the forest resources of the adjoining areas as a result of the fuel-oil shortage.

AFRICA

Deep mining costs discouraging—O'Okiep starts producing—Premier industrial diamond mine reopened

★New Consolidated Gold Fields supplied the Committee on Deep Level Mining with an estimate of the increase in working costs of one mine of the group due to the provision for ventilation and refrigeration at depths between 7,750 ft. and 12,750 ft. They put it at 6s.6d. per ton and estimated

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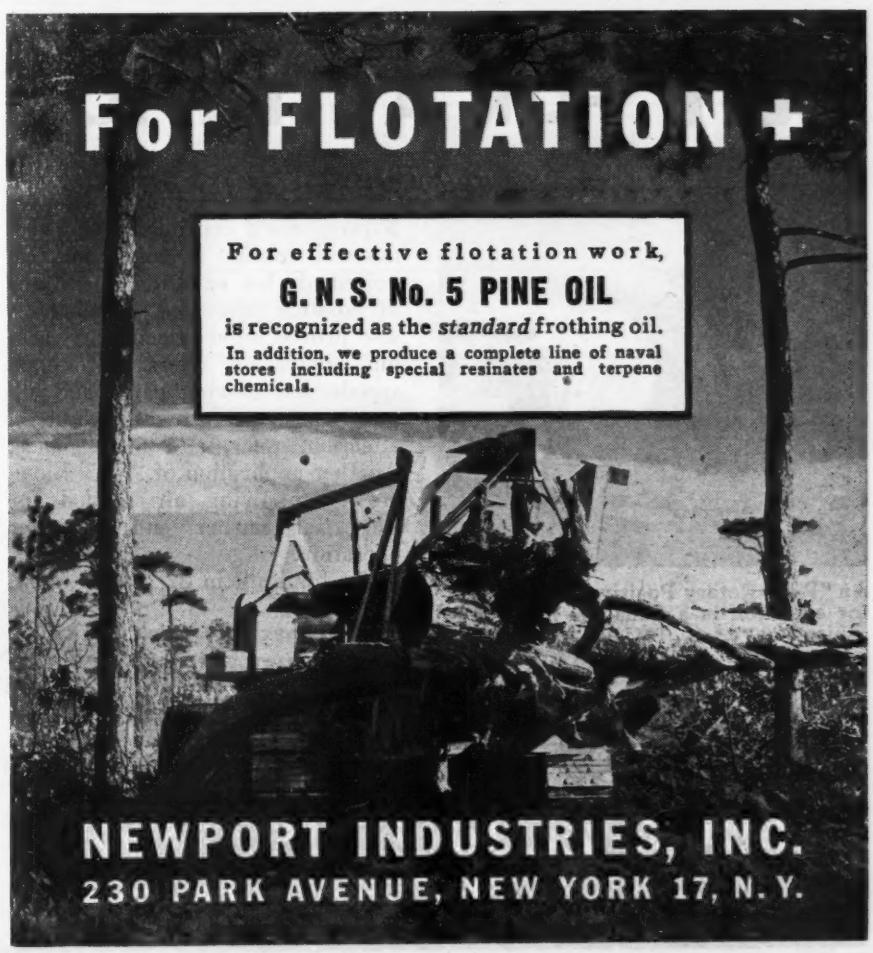
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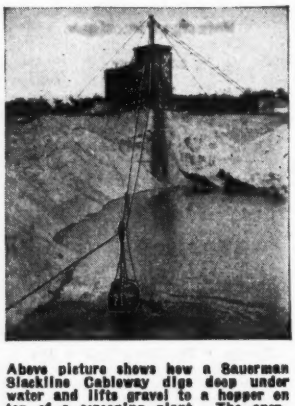

Above picture shows how a Sauerman Slackline Cableway digs deep under water and lifts gravel to a hopper on top of a screening plant. The operating cost is only a few cents per cubic yard handled and the machine cleans up every yard of material within a 700-ft. radius of the plant. This machine was installed in 1919—has handled several million cubic yards at three locations—is still as good as new.

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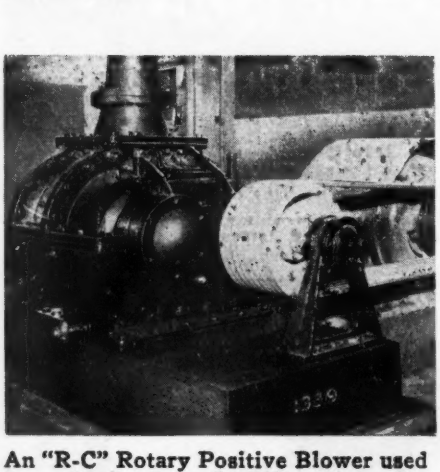

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Africa (*continued*)

the capital cost at £4,500,000, which would require 5s. per ton for interest and amortization. In effect, the increase in working costs would be about 11s.-6d. a ton. "Such a substantial increase in the cost of ventilation and the probability of other increases in costs do not make a deep-level mining program attractive," states the committee in its report, "especially if taken in conjunction with the comparatively moderate working profits of the mines from the Durban-Roodepoort Deep to E.R.P.M., which for the last two years have varied from 3s.2d to 15s. a ton and have averaged about 9s.6d a ton."

The foregoing figures relate to the costs for an existing mine that is approaching the deep-level margin. If a new mine had to be started to deal only with the deep-level area, the Central Mining & Investment Corporation estimates that the capital cost of shaft-sinking and equipment would amount to £8,715,000 for a mining area containing 25,000,000 tons of payable ore. The conclusion arrived at by the corporation is that such a proposition is financially unattractive and that the Central Witwatersrand offers no justification for starting such new mines. The committee endorsed the contention that on the Central Witwatersrand the government should not encourage the opening of new mines to exploit the deep-level ground, but should, so far as possible, assist the existing mines to work to the greatest possible depth and to proceed by way of gradual evolution.

★The latest information regarding the position of the St. Helena lease area, in the Free State, was forthcoming from the chairman at the annual meeting of the Western Holdings held in April. No active work has been possible in the area during the war, he said, but with the end of the war in sight it is hoped that early steps will be taken to start work on the property.

★So many new applications have been found for industrial diamonds, each resulting in lower production costs, that the use of this stone in postwar industry seems assured. The steadily increasing demand for industrial diamonds has prompted the reopening of the Premier mine, which has been closed since 1932. This mine in its day was one of the leading producers of industrial diamonds. Steps were taken towards the end of last year to begin unwatering the mine. A 15-in. pipe column has been laid down the incline shaft from the surface to the water level, the necessary pumping plant is on order, and it is expected that unwatering operations will begin this year. Plans are in hand for re-equipping the mine on modern lines, based on the treatment of 8,000 loads per shift of eight hours when production is resumed.

★At De Beers Consolidated Mines, Kimberley, mining and washing operations were continued on a single-shift basis at Dutoitspan mine until Jan. 17, 1944, when a second mining and washing shift was put into commission. Operations continued on this scale until Sept. 30, when it was decided to resume production at Bultfontein mine, and one shift was accordingly transferred from Dutoitspan mine on Oct. 1.

★As a result of the development work undertaken on the Kimberley Reef on the property of Daggafontein Mines, Ltd., the consulting engineers have recommended the sinking of a new shaft to that reef. The cost will be about £1,000,000, but as the present development work will take some time, it will probably not be necessary to start shaft sinking until the middle of 1946. Orders are to be placed immediately for the sinking equipment. No decision has been made as to how the program will be financed. The decision to erect an entirely new and separate reduction plant with a capacity of 750,000 tons per annum to treat this Kimberley reef is also a departure from recognized Witwatersrand practice, as hitherto ore from different reefs has always been treated in the same plant.

★The number of gold producers in Southern Rhodesia will soon be on the increase and the gold output will begin to rise steadily, said the Ministry of Mines, L. B. Fereday, addressing the conference of the Rhodesia Associated Mine-workers recently. Mining men are beginning to believe that the government is going forward with a bold policy to assist the development and expansion of the mining industry for the good of all people in the colony, and he promised them that they were going to get more encouragement. Mr. Fereday said that the commission appointed to inquire into the mining industry of the colony would start work soon, and that the government was considering the introduction of silicosis legislation.

★The management of Rezende Mines, Ltd., Southern Rhodesia, reports that No. 1 borehole, situated 1,200 ft. west of Rezenda Mines' most westerly underground workings, has been drilled to a total depth of 1,145 ft. Following are the full details of the reefs met. At 200 ft., Old West Lode assaying 2.1 dwt. over 60 in.; at 443 ft., Redwing reef assaying 7 dwt. over 20 in.; at 1,038 ft. the Rezende hanging-wall leader assaying 149.5 dwt. over 6 in.; at 1,145 ft. the footwall country was entered.

★The Chamber of Mines' analysis of March gold-mining production (already announced at 1,036,443 oz., including miscellaneous returns and the yield from outside districts), shows that Witwatersrand milling totaled 4,984,900 tons and that the average yield per ton milled was 4.026 dwt.

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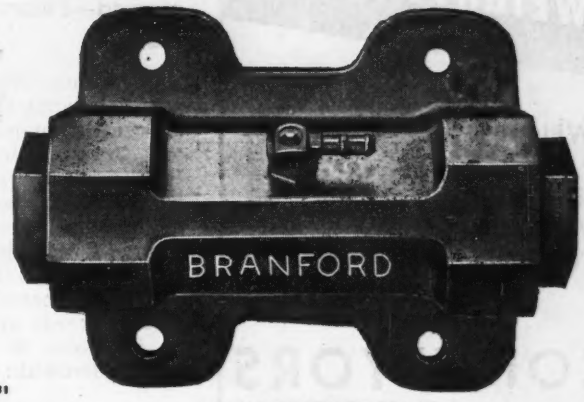

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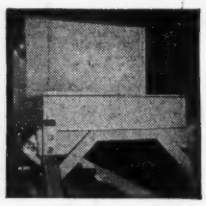

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AUSTRALIA

Serious decline in gold mining—Mt. Isa copper operations reviewed—Future of Bulolo considered

★Conditions brought about by the war, involving shortage of labor, inadequate supplies of essential stores, and the requisitioning of machinery for defense and government purposes, have caused a serious decline in the gold-mining industry during the war years. Production of some of the states has not been announced, but recently released figures have completed records up to the end of 1943, as is shown in the tabulation presented herewith:

Australian Gold Production, 1939-1943, in Fine Ounces

State	1939	1940	1941	1942	1943
New South Wales	87,189	100,225	88,091	77,249	63,779
Victoria	156,522	180,567	149,769	101,497	56,511
Queensland	147,000	155,000	120,000	96,416	62,838
South Australia	4,000	3,270	1,679	1,333	519
Western Australia	1,214,238	1,191,482	1,109,318	848,180	546,475
Tasmania	19,984	19,171	19,908	18,353	17,245
Northern Territory	16,586	22,423	18,868	12,058	3,912
Totals	1,645,519	1,672,168	1,507,633	1,155,086	751,279

The decline in output is entirely due to the conditions mentioned. But for the intervention of the war, increases in production were expected. It is notable, however, that the only increase in production due to the discovery of new fields or mines is that of the Northern Territory, where the Tennant Creek goldfield has lifted the output from 489 oz. in 1932. It is an unfortunate fact that practically the whole of the rise in production is the result of favorable developments at greater depth in existing mines or improvements in mining or metallurgical methods which have made possible the working of lower-grade ore, of more refractory ores, or have assisted the managements so to reduce costs as to more than compensate for unavoidable increases in working expenses brought about by rises in wages and shorter hours in the industry. There is still an important future before gold mining, but the inevitable decline is not far ahead unless intensive prospecting by modern methods can locate new gold occurrences at present obscured by superficial deposits.

WESTERN AUSTRALIA

★Consolidated Gold Mines of Coolgardie, which operates the Tindals Gold mines, in that mining district, has severely felt existing conditions. At the beginning of the war the company had increased the capacity of the plant to 10,000 tons of ore per month, but the reduction of labor in the gold-mining industry to approximately 40 percent of the original number made it impossible for the mine to continue economical working. Every effort was made to avoid closing the mill, but cessation of operations was eventually necessary. In the last operating period, 33,100 tons of ore was treated for the recovery of 5,127 oz. of gold, which realized £A53,633. Head value of the ore treated was 3.78 dwt. per ton and the assay value of the tailings was 0.69 dwt. per ton, representing an average recovery of 81.7 percent. Ore reserves were estimated at 25,519 tons of oxidized ore and 363,647 tons of sulphide ore, making a total of 389,166 tons having an average assay value of 4.2 dwt. per ton. Tindals mine, in the early years of the field, was one of the most important producers.

★Western Australian Blue Asbestos Fibres, Ltd., has been faced by many wartime disabilities which have adversely affected initial work on the leases. Labor has been in short sup-

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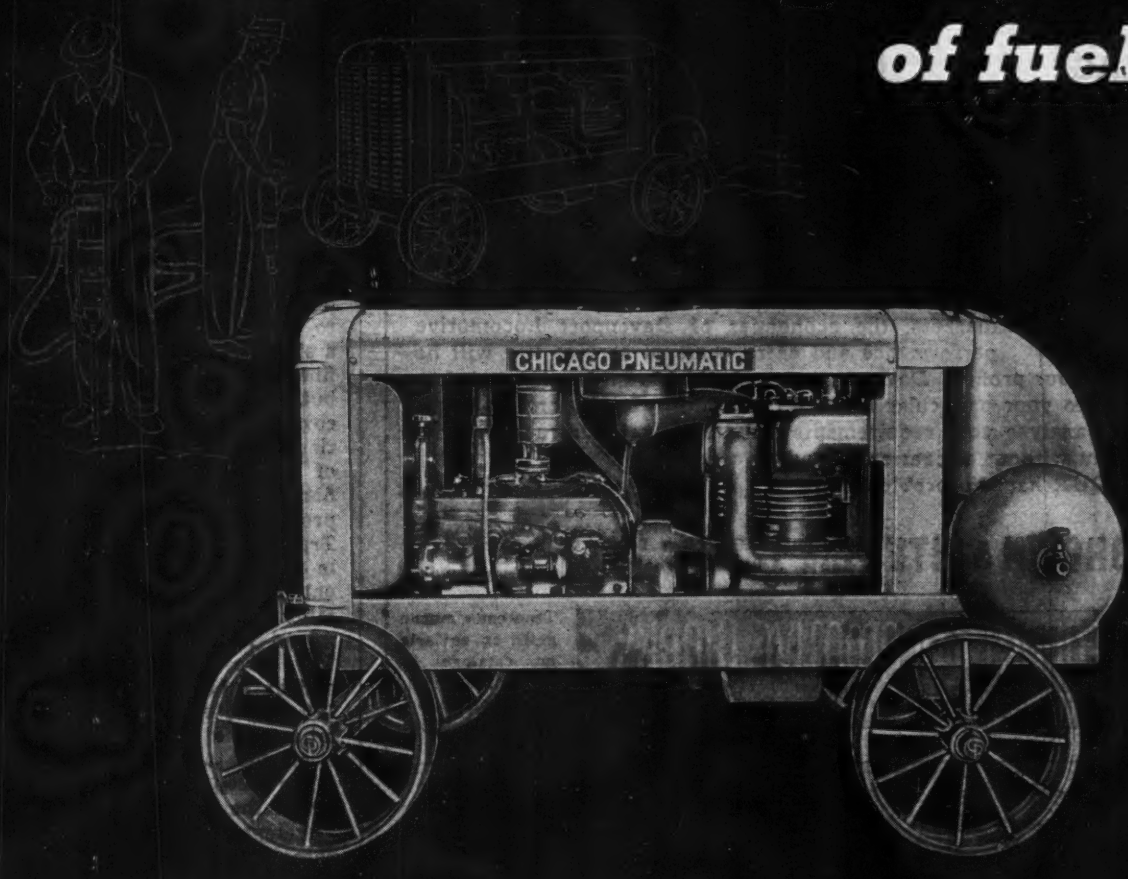

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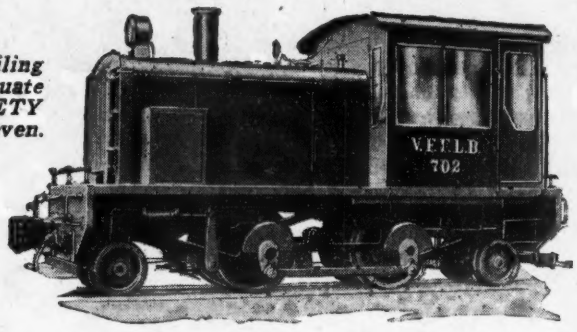

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Australia *(continued)*

ply, as have also machinery and plant; there has been irregularity in shipping for transport of plant and materials to Roebourne, the nearest port to the asbestos field, and long delays have occurred in obtaining priorities for essential plant. In addition there have been the difficulties inseparable from a remote locality. These troubles have led to expenditure in excess of expectations, and to allow the company to complete its plant and mine development, finance has been arranged by the State Government. The company has secured contracts for the supply of fiber which assure successful operation when all preliminary work has been completed. The work carried out to date has brought the company to a stage where an output of 40 tons of fiber per month would be possible, but this production is insufficient to cover working expenses and the additional expenditure is for the purpose of increasing output to 100 tons of fiber monthly. The quality of the fiber produced is of the highest grade. Transport charges are a large factor in operating costs, for the mine is situated in the Hamersley Ranges, 900 miles north of Perth and 120 miles inland from the port of Roebourne. The asbestos deposits are extensive and have been proved for a length of 120 miles, with a width of about 30 miles. The range, which is actually a rugged tableland, is intersected by many deep gorges, in the sides of which the asbestos beds are exposed. Development and mining are therefore assisted by the topography.

QUEENSLAND

★Silver-lead-zinc mining ceased at Mt. Isa Mines, Ltd., in the latter half of 1943, since when work has been concentrated on copper production. The copper lode is situated on the west side of the Black Star lead-zinc lode, in dolomitized shales, the copper mineralization having been proved by the company's geological staff to be proportional to the degree of dolomitisation and to the extent of fracturing undergone by the shales. The orebody has been opened up between the No. 7 and No. 9 levels and has been proved by diamond drilling to extend 200 ft. below the latter, exploratory drilling not having penetrated below that depth. The occurrence has now been proved to be one of the most important in the Commonwealth. The average value of the ore was previously regarded as 3.1 percent copper, but a recalculation of ore reserves has placed the tonnage at 2,387,216 tons and the average value at 3.75 percent copper. In the lead-zinc section ore reserves are estimated at 7,116,740 tons assaying 8.6 percent lead, 7.7 oz. silver, and 8.5 percent zinc, the tonnage being distributed in four lodes, of which the Black Star and Racecourse are the most important. Development work, exclusive of stope

preparation was at the low figure of 1,097 ft., compared with the previous year's figure of 2,966 ft. As a result of the manpower position, the mine is 10,000 ft. of development in arrears. Exploratory diamond drilling footage was also very low, amounting to 1,402 ft. all in the copper lode, compared with 10,584 ft. the year before. The work was confined to the determination of ore limits to assist in stope design and to explore for lateral and downward extensions of the orebody. Blast-hole drilling was continued as intensively as possible. Results were:

Year	Feet Drilled	Tons Prepared	Shifts	Feet Per Shift
1943...	56,928	126,943	1,499	39.3
1944...	57,791	96,454	1,397	41.37

The reduction in tonnage per foot was due to the larger proportion of cut-off stope drilling in which the spacing of holes is much closer than in open-stope work. The expansion of the copper section of the company's work is clearly shown by the milling figures for the last three yearly periods.

Year	Ore Milled, Tons
1942	20,250
1943	70,323
1944	250,325
Copper Concentrates Produced, Tons	
1942	2,394
1943	10,901
1944	39,640

The recovery of copper in mill concentrates was:

Year	Recovery, %
1942	81.8
1943	89.6
1944	93.2

Copper smelting did not commence until the second half of 1943, when the smelter operated for three months. Results from this section of the plant were:

Year	Matte Treated, Tons	Blister Copper Produced, Tons
1943	3,790	1,800
1944	21,782	10,694

The Mt. Isa company purchases the output of ore from the small party-owned mines of the Cloncurry copper field to the amount of 7,000 to 8,000 tons per year. This ore is of smelting grade and is added to the furnace charge. The furnace charge during 1944 was made up as follows:

Material	Percent of Total
Sinter	42.6
Concentrates	33.9
Matte	3.8
Limestone	0.1
Purchased ore	1.5
	85% sintered
Converter slag	17.8
Flue dust, Mt. Isa oxide ore, etc.	0.3
	100.0
Coke	14.1

Although the total power generated was 30 percent less than in the previous year, the unit cost was practically unchanged. The power house figures were:

Total kw.-hr. generated	35,685,820
Coal consumed, tons	24.184
Lb. steam per lb. coal	8.79
Lb. coal consumed per kw.-hr. generated	1.5220
Direct cost per kw.-hr., pence	0.4776

(*Continued on page* 154)

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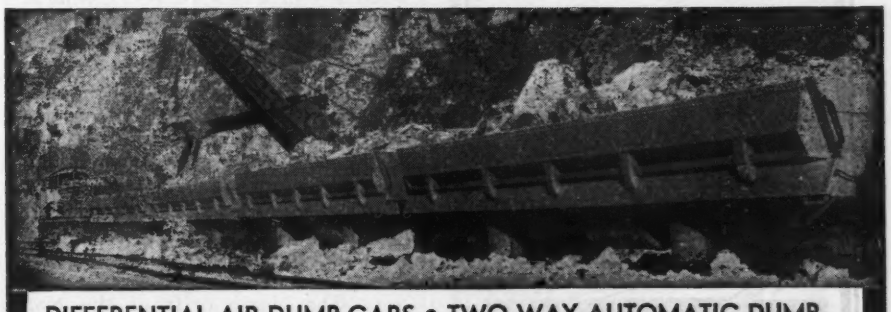

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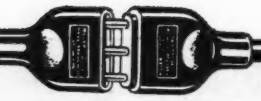

MINES

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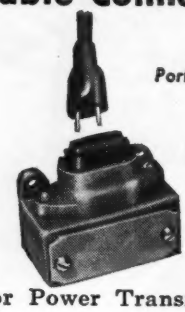

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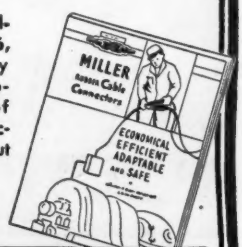

MINES EQUIPMENT COMPANY

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St. Louis 10, Missouri

Australia *(continued)*

Operating costs for 1944 were:

	Shillings Per Ton
Mining and development	20.655
Milling	6.421
Smelting and converting	13,278
Administration and general	4.941
Railage and handling	1.723
Total	47.018

These operating costs include delivery of blister copper into ship's hold at Townsville, but exclude all ocean freight and refinery charges. During 1944 the company employed 817 men, against 989 in the 1943 period. In addition to the reduction in number, absenteeism was a serious problem. The company has under consideration a dual copper-lead mining, milling, and smelting operation to be put into effect at the end of the war. This policy will involve substantial expenditure for copper milling and smelting plant and will require the employment of twice as many men as at present.

NEW GUINEA

Consideration is being given to reconditioning of plant and resumption of operations by Bulolo Gold Dredging, Ltd. Unfortunately the hydroelectric plant, buildings, workshops, and aeroplanes were destroyed during the war, and their replacement will involve some time. The dredges are, however, in good structural condition, but some replacements will be needed to put them in shape for operation. No estimate has been made as to when resumption of work may be expected. So far as is known, no repair party has yet been sent to the property, but it is thought that a start on this work will not be long delayed.

BRITISH GUIANA

New vein discovered at Aleck Hill mine of Cuyuni Goldfields, Ltd.

★S. M. Manning, general manager of Cuyuni Goldfields, Ltd., reports the discovery of a new vein 8 ft. wide and averaging 2.88 oz. gold per ton on the No. 1 level of the Aleck Hill mine at Aurora Landing, British Guiana. The 10 West crosscut on the same level has cut a vein 9 ft. wide, averaging 2.24 oz. gold per ton. The No. 15 orebody on the No. 2 level exposes ore for a length of 74 ft. with the face still in ore. Average width is 33 ft., and overall average grade 1.43 oz. gold per ton. A raise driven to the No. 1 level averaged 1.30 oz. gold per ton. The North drift of the No. 2 level has a proved width of 11 ft. with a grade of 2.50 oz. W. J. Asselstine, managing director, states that recent developments prove the persistence of high-grade occurrences to depth, and that 25 new miners have been engaged to step up development.

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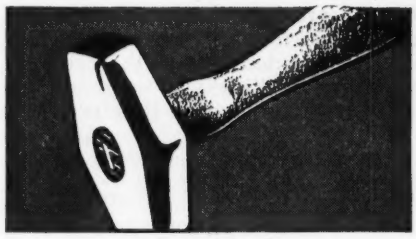

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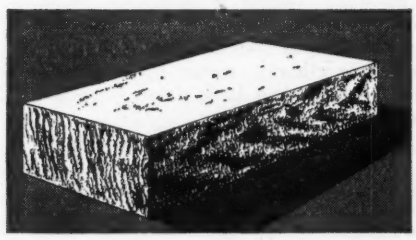

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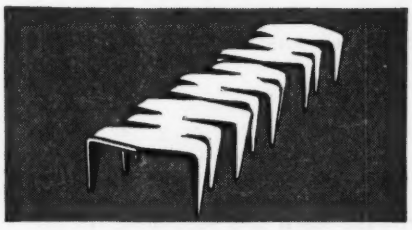

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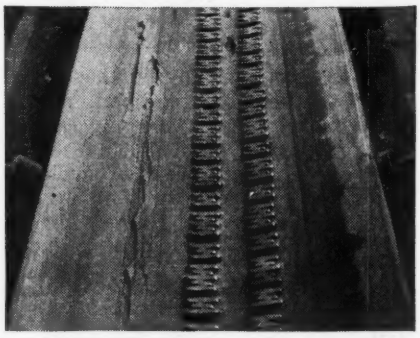

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